

July 29, 2011

Ms. Denise Goddard  
United States Environmental Protection Agency  
Science and Ecosystem Support Division  
980 College Station Road  
Athens, GA 30605-2720

Subject: Data Review and Validation  
Site Name: Smokey Mountain Smelter, Knoxville, TN  
Project No.: DG-0725  
ELEMENT Sample ID. Nos: NA  
Inorganic Analysis: Spectrum Analytical, Tampa, FL  
Date(s) Sampled: 05/02 - 12/11  
VTSR Date: 05/20/11  
Date Received from Lab: 07/08/11  
TDF No. 10T1637

Dear Ms. Goddard:

The ESAT Work Team has reviewed the above-captioned data package consisting of adequate deliverables to document EPA Methods SM5220D for COD; SW9060 for TOC and dissolved organic carbon; SW300.1 for chloride, nitrate, nitrite, ortho-phosphate, and sulfate; E350.1 for ammonia; E351.2 for total Kjeldahl nitrogen (TKN); SW7196A for hexavalent chromium; and E160.1 for TDS for twenty-six soil samples and thirteen water samples according to EPA guidelines. This package presents acceptable technical performance and generally met the standard for quality required by Region 4 except as detailed below.

Examination of laboratory blank samples revealed apparent low-level contamination with several analytes. Reported detection limits were adjusted as high as ten times the blank levels to discount possible false positives due to contamination in the method blanks.

Several pairs of field duplicates were taken during this sampling effort. The results were evaluated by calculation of relative percent difference (RPD) and where they exceeded Region 4 SOP guidelines, it is noted below. It is Region 4 policy not to qualify data based on field duplicate precision and this data is provided for informational purposes only. Matrix precision for field duplicates was outside of control limits for TOC (110 RPD) and ammonia (39 RPD) in soil in SDG 3502795.

Dilutions for nitrate and nitrite were analyzed outside of holding times for sample SMSGWJ08. Original and diluted results are provided and the results from the dilution are considered estimated and "J" qualified.

Matrix spike recoveries were below control limits for fluoride (10%), nitrite (10%), ortho-phosphate (5%), sulfate (70%), and TKN (59%). The results for fluoride, nitrite, sulfate, and TKN in sample SMSSD08 were considered estimated and "J" qualified. The ortho-phosphate result in sample SMSSD08 was considered unusable and "R" qualified.

Matrix precision was outside of control limits (78 RPD) for nitrite for sample SMSSD08. The nitrite result for sample SMSSD08 was considered estimated and "J" qualified.

A Stage 4 validation consisting of manual review of QC summary data was performed on the samples submitted for this case.

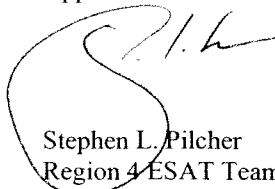
Further details are provided in the attached review summary form. Please feel free to contact this office if we can be of further service.

Very truly yours,



Sue Jones  
Senior Inorganic Data Reviewer  
Integrated Laboratory Systems

Approved:



Stephen L. Pilcher  
Region 4 ESAT Team Manager  
Integrated Laboratory Systems



# Inorganic Data Quality Assessment Record (DQAR)

Review Date:	07/29/11	Analyses:	COD, TOC, DOC, NH3, NO3, NO2, Cr+6, Cl, FI, PO4, SO4, TKN, TDS	Matrix:	Water & Soil	Project #:	DG-0725
SDG /Lab File:	3502918, 3502773, 3502961, 3502852, 3502795, 3502823						
Laboratory	Spectrum Analytical, Tampa, FL						
Site Name:	Smokey Mountain Smelter, Knoxville, TN						
Check One:	EPA	ESAT	CLP	Other (specify)	Non-CLP (RAS)		

Signatures: **SJ**

Reviewer

Review Codes: M- Metals, H- Mercury, C- Cyanide, O- Others

## Sample Numbers:

Water:	Soil/Sediment:
SMSSW01 – SMSSW10	SMSSD01 SMSSFC13
SMSSW04D	SMSSD03 – 10 SMSSFJ04
SMSSW08SPRING	SMSSD04D SMSSFL04
SMSSW09SPRING	SMSSBJ10-17.5 – 23 SMSSFI04
	SMSSBJ09-10 – 15 SMSSFM06
	SMSSBJ08-13 – 17 SMSSFM04
	SMSSGWJ08-21 SMSSBJ07
	SMSSFF15
	SMSSFE15
	SMSSFH05
	SMSSFH95
	SMSSFE13

## I. SUMMARY OF PROBLEMS AND COMMENTS:

A summary of deficiencies noted for the methods used to generate data for this project is presented below. Please refer to the Data Quality Assessment Record (DQAR) for each data file and the data flag summary table at the end of this review document. For the purposes of this review, the QC limits specified in the analytical method have been applied to the data. Data qualifier recommendations are made in accordance with the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (Functional Guidelines), and the Region 4 SOP, Data Validation Standard Operating Procedures for Contract Laboratory Program Routine Analytical Services (R4DVSOP).

### Data Review Comments:

- Matrix spike recoveries were low for FI, NO2, PO4, SO4, TKN in sample SMSSD08.
- Matrix precision was over control limits for NO2 in sample SMSSD08.
- Holding times were missed for dilutions for NO3 and NO2 in sample SMSGWJ08.

II. Data Quality Assessment (An explanation for any "no" answer must be provided)				
1.	Summary	Yes	N/A	No
	Were all requested analyses performed?	<b>O</b>	<b>M,H</b>	
	Were all required QC checks performed?	<b>O</b>	<b>M,H</b>	
	Were all required documents present?	<b>O</b>	<b>M,H</b>	
	Were requested detection limits met?	<b>?</b>		
Remark: Required detection limits are unknown.				
2.	Holding Times:(Holding times are not applicable for non-aqueous samples)	Yes	N/A	No
	Were water samples properly preserved?	<b>O</b>	<b>M,H</b>	
	Were water holding time requirements met?		<b>M,H</b>	<b>O</b>
Remark: Holding times were missed for dilutions for NO3 and NO2 in sample SMSGWJ08.				



<b>3.</b>	Calibrations:		Yes	N/A	No
	A. Initial Calibration:				
	Were acceptable correlation coefficients obtained?		<b>O</b>	<b>M,H</b>	
	Were acceptable % Recoveries for analytes obtained?		<b>O</b>	<b>M,H</b>	
	B. Continuing Calibration				
	Were acceptable % Recoveries for analytes obtained?		<b>O</b>	<b>M,H</b>	
	Remark:				
<b>4.</b>	Blanks:		Yes	N/A	No
	Were any contaminants noted in the blanks?		<b>O</b>	<b>M,H</b>	
	If yes, were blank rules applied to the data?		<b>O</b>	<b>M,H</b>	
	Remark: 10X rule applied				
<b>5.</b>	ICP Interference Check Sample:		Yes	N/A	No
	Were results within 20% of the true value?			<b>M,H,O</b>	
	Were False positives Reported?			<b>M,H,O</b>	
	Were False negatives reported?			<b>M,H,O</b>	
	Remark:				
<b>6.</b>	Matrix spikes:		Yes	N/A	No
	Was a matrix spike analysis performed?		<b>O</b>	<b>M,H</b>	
	Were samples spiked at appropriate levels?		<b>O</b>	<b>M,H</b>	
	Were matrix spike/matrix spike duplicate analyses performed?		<b>O</b>	<b>M,H</b>	
	Were acceptable recoveries obtained?			<b>M,H</b>	<b>O</b>
	Was acceptable precision obtained?			<b>M,H</b>	<b>O</b>
	Remark: MS recovery low for FI, NO2, PO4, SO4, and TKN. RPD high for NO2.				
<b>7.</b>	Matrix duplicate analysis:		Yes	N/A	No
	Was a matrix duplicate analysis performed?		<b>O</b>	<b>M,H</b>	
	Was duplicate precision in control?				<b>O</b>
	Remark: RPD outside of control limits for TOC and NO2 in field duplicates.				
<b>8.</b>	Performance Evaluation Sample:		Yes	N/A	No
	Was a P.E. Sample analyzed with the samples?			<b>M,H</b>	<b>O</b>
	If yes, were acceptable results obtained?				
	Remark:				
<b>9.</b>	Method Standard / Laboratory Control Sample:		Yes	N/A	No
	Were acceptable recoveries obtained?		<b>O</b>	<b>M,H</b>	
	Was acceptable precision obtained?		<b>O</b>	<b>M,H</b>	
	Remark:				
<b>10.</b>	ICP Serial Dilution Sample:		Yes	N/A	No
	Was ICP serial dilution analysis performed?			<b>M,H,O</b>	



	Were diluted results within 10% of undiluted sample result?				
	Remark:				
<b>11.</b>	Completeness:		Yes	N/A	No
	Were all requested analyses performed?		<b>O</b>	<b>M,H</b>	
	Were all required documents present? If yes, were results provided?		<b>O</b>	<b>M,H</b>	
	Were results of calculation checks acceptable?		<b>O</b>	<b>M,H</b>	
	Remark:				



### Additional Comments:

#### III. Data Qualifiers Summary

Based on a review of the quality control information, the following is a table summarizing the data qualifiers used by Region IV for this data review report.

Recommended Data Qualifiers				
Case	NA	Project Number:	DG-0725	ELEMENT Sample ID Nos.
Site	Smokey Mountain Smelters, Knoxville, TN			Date: 07/29/11
Affected Samples	Analytes	Recommended Qualifiers		Reason
SMSSD08	F1, NO2, PO4, SO4, TKN	J, QM-1		Low MS recovery
SMSSD08	NO2	J, QM-4		High RPD
SMSGWJ08	NO3 and NO2	J, H-1		Holding times missed for dilution.
SMSSD08	PO4	R, QM-6		MS recovery < 10%



May 21, 2014

Ms. Denise Goddard  
United States Environmental Protection Agency  
Science and Ecosystem Support Division  
980 College Station Road  
Athens, GA 30605-2720

Subject: Data Review and Validation  
Site Name: Smokey Mountain Smelters, Knoxville, TN  
Project No.: DG-0520  
ELEMENT Sample ID. Nos: NA  
Inorganic Analysis: Spectrum Analytical, Tampa, FL  
Date(s) Sampled: 6/3 - 5/2013 and 6/26 - 28/2012  
VTSR Date: 6/6/2013 and 6/29/2012  
Date Received from Lab:  
TDF No.: 14T0546

Dear Ms. Goddard:

The ESAT Work Team has reviewed the above-captioned data package consisting of adequate deliverables to document EPA Methods E310.1 for alkalinity; E350.1 for ammonia; E300.1 for ortho-phosphate, fluoride, chloride, and sulfate; E353.2 for nitrate and nitrite, and E160.1 for total dissolved solids (TDS) for twenty water samples according to EPA guidelines. This package presents acceptable technical performance and generally met the standard for quality required by Region 4 except as detailed below.

Examination of laboratory blank samples revealed apparent low-level contamination with nitrate/nitrite. Reported detection limits were adjusted as high as ten times the blank levels to discount possible false positives due to contamination in the method blanks.

Holding times were missed for ortho-phosphate for all samples in SDG 3506439. Four of the samples were received out of holding times in this SDG.

A Stage 4 validation consisting of manual review was performed on the inorganic samples submitted for this case.

Further details are provided in the attached review summary form. Please feel free to contact this office if we can be of further service.

Very truly yours,



Sue Jones  
Chemist  
Alion Science and Technology  
ESAT Contractor, Region 4 EPA







# Inorganic Data Quality Assessment Record (DQAR)

Review Date:	5/19/14	Analyses:	NO3, NO2, PO4, SO4, F, Cl, NH3, Alk., TDS	Matrix:	Water	Project #:	DG-0520
SDG /Lab File:	3509413 and 3506439						
Laboratory	Spectrum Analytical, Tampa, FL						
Site Name:	Smokey Mountain Smelters, Knoxville, TN						
Check One:	EPA	ESAT	CLP	Other (specify)	Non-CLP (RAS)		

Signatures: SJ

Reviewer

Review Codes: M- Metals, H- Mercury, C- Cyanide, O- Others

## Sample Numbers:

Water:	Soil/Sediment:
SMSMW12A	SMSMW02A
SMSMW01A	SMSMW07A
SMSMW03B	SMSMW07B
SMSMW04A	SMSMW08A
SMSMW10B	SMSMW901A
SMSMW11A	SMSMW903B
SMSMW11B	SMSMW10A – both sdgs
SMSMW12B	SMSRB062812
SMSMW13B	SMSMW13A
	SMSMW911B

## I. SUMMARY OF PROBLEMS AND COMMENTS:

A summary of deficiencies noted for the methods used to generate data for this project is presented below. Please refer to the Data Quality Assessment Record (DQAR) for each data file and the data flag summary table at the end of this review document. For the purposes of this review, the QC limits specified in the analytical method have been applied to the data. Data qualifier recommendations are made in accordance with the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (Functional Guidelines), and the Region 4 SOP, Data Validation Standard Operating Procedures for Contract Laboratory Program Routine Analytical Services (R4DVSOP).

### Data Review Comments:

II. Data Quality Assessment (An explanation for any "no" answer must be provided)				
		Yes	N/A	No
1.	Summary			
	Were all requested analyses performed?	O		
	Were all required QC checks performed?	O		
	Were all required documents present?	O		
	Were requested detection limits met?	?		
Remark: Project required detection limits are unknown.				
2.	Holding Times: (Holding times are not applicable for non-aqueous samples)	Yes	N/A	No
	Were water samples properly preserved?	O		
	Were water holding time requirements met?	O		O
Remark: Holding times for o-phosphate were missed in SDG 3506439. Samples were "J" qualified.				







<b>3.</b>	Calibrations:		Yes	N/A	No
	A. Initial Calibration:				
	Were acceptable correlation coefficients obtained?		<b>O</b>		
	Were acceptable % Recoveries for analytes obtained?		<b>O</b>		
	B. Continuing Calibration				
	Were acceptable % Recoveries for analytes obtained?		<b>O</b>		
	Remark: Evaluation was performed according to the laboratory calibration limits for these non-CLP analytes which are outside of the +/- 10% customarily used for metals evaluation.				
<b>4.</b>	Blanks:		Yes	N/A	No
	Were any contaminants noted in the blanks?		<b>O</b>		<b>O</b>
	If yes, were blank rules applied to the data?		<b>O</b>		
	Remark: 10X rule applied				
<b>5.</b>	ICP Interference Check Sample:		Yes	N/A	No
	Were results within 20% of the true value?			<b>O</b>	
	Were False positives Reported?			<b>O</b>	
	Were False negatives reported?			<b>O</b>	
	Remark:				
<b>6.</b>	Matrix spikes:		Yes	N/A	No
	Was a matrix spike analysis performed?				<b>O</b>
	Were samples spiked at appropriate levels?				<b>O</b>
	Were matrix spike/matrix spike duplicate analyses performed?				<b>O</b>
	Were acceptable recoveries obtained?				<b>O</b>
	Was acceptable precision obtained?				<b>O</b>
	Remark: There were no samples identified for MS/MSD analysis. LCS/LCSD recoveries and RPDs were used for accuracy and precision information.				
<b>7.</b>	Matrix duplicate analysis:		Yes	N/A	No
	Was a matrix duplicate analysis performed?				<b>O</b>
	Was duplicate precision in control?			<b>O</b>	
	Remark: LCS/LCSD recoveries and RPDs were used for accuracy and precision information.				
<b>8.</b>	Performance Evaluation Sample (PES):		Yes	N/A	No
	Was a P.E.S. analyzed with the samples?				<b>O</b>
	If yes, were acceptable results obtained?				
	Remark:				
<b>9.</b>	Method Standard / Laboratory Control Sample:		Yes	N/A	No
	Were acceptable recoveries obtained?		<b>O</b>		
	Was acceptable precision obtained?		<b>O</b>		
	Remark:				







<b>10.</b>	ICP Serial Dilution Sample:		Yes	N/A	No
	Was ICP serial dilution analysis performed?				<b>O</b>
	Were diluted results within 10% of undiluted sample result?			<b>O</b>	
	Remark:				
<b>11.</b>	Completeness:		Yes	N/A	No
	Were all requested analyses performed?		<b>O</b>		
	Were all required documents present? If yes, were results provided?		<b>O</b>		
	Were results of calculation checks acceptable?		<b>O</b>		
	Remark:				







**Additional Comments:**

### III. Data Qualifiers Summary

Based on a review of the quality control information, the following is a table summarizing the data qualifiers used by Region 4 for this data review report.

Recommended Data Qualifiers				
Case	NA	Project Number:	DG-0520	ELEMENT Sample ID Nos.
Site	Smokey Mountain Smelters, Knoxville, TN			Date:
Affected Samples	Analytes	Recommended Qualifiers		Reason
SMSMW02A, SMSMW08A, SMSMW10A	Fluoride	J, CLP02		Value reported exceeded calibration range
SMSMW01A, SMSMW901A, SMSMW02A, SMSMW03B, SMSMW903B, SMSMW04A, SMSMW07A, SMSMW07B, SMSMW08A, SMSMW10A, SMSMW10B, SMSRB062812	o-PO4	J, H-1		Holding time missed
SMSMW02A, SMSRB062812	Sulfate	J, Q-2		Concentration <RL and >MDL
SMSMW10B	Ammonia	J, Q-2		Concentration <RL and >MDL
SMSRB062812	Chloride	J, Q-2		Concentration <RL and >MDL







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW01A

Lab Code: PEL Case No.: SAS No: SDG No.: 3506439

Matrix: WATER Lab Sample ID: 350643901

Level: (low/med) LOW Date Received: 6/29/2012

Percent Solids: 0 Station ID:

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	710			IS	5	10
7664-41-7	Ammonia	252			AS	0.02	0.25
7782-41-4	Fluoride	10	U		IC	3.3	10
1-00-5	Nitrate + Nitrite	109			AS	0.0022	0.1
14265-44-2	ortho-Phosphate-P	10	UJ, H-1		IC	2.4	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	93.2	90 - 115	

Color Before: Clarity Before: Texture :

Color After : Clarity After: Artifacts:

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW01ADL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3506439Matrix: WATERLab Sample ID: 350643901DL1Level: (low/med) LOWDate Received: 6/29/2012Percent Solids: 0

Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	19900			IC		170	500
3-03-5	Sulfate	913			IC		160	500

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	96.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW901A

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3506439Matrix: WATER Lab Sample ID: 350643902Level: (low/med) LOW Date Received: 6/29/2012Percent Solids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
47752-0-60-0	Alkalinity (Total)	760			IS		5	10
7664-41-7	Ammonia	278			AS		0.02	0.25
7782-41-4	Fluoride	10	U		IC		3.3	10
1-00-5	Nitrate + Nitrite	113			AS		0.0022	0.1
14265-44-2	ortho-Phosphate-P	10	U, H-1		IC		2.4	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	92.8	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW901ADL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3506439Matrix: WATERLab Sample ID: 350643902DL1Level: (low/med) LOWDate Received: 6/29/2012Percent Solids: 0

Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	20300			IC		170	500
3-03-5	Sulfate	931			IC		160	500

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	94.4	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW02A

Lab Code: PEL Case No.: SAS No: SDG No.: 3506439

Matrix: WATER Lab Sample ID: 350643903

Level:(low/med) LOW Date Received: 6/29/2012

PercentSolids: 0 Station ID:

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
47752-0-60-0	Alkalinity (Total)	1270			IS		5	10
7664-41-7	Ammonia	78.3			AS		0.02	0.25
7782-41-4	Fluoride	266	J	CLP02	IC		3.3	10
1-00-5	Nitrate + Nitrite	<del>0.0438</del> 0.1	UJ		AS		0.0022	0.1
14265-44-2	ortho-Phosphate-P	10	UJ	H-1	IC		2.4	10
3-03-5	Sulfate	5.3	J	Q-2	IC		3.2	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	94.4	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0 SMSMW02ADL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3506439

Matrix: WATER Lab Sample ID: 350643903DL1

Level: (low/med) LOW Date Received: 6/29/2012

Percent Solids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	3170			IC		34	100

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	96.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW03B

Lab Code: PEL Case No.: SAS No.: SDG No.: 3506439

Matrix: WATER Lab Sample ID: 350643904

Level:(low/med) LOW Date Received: 6/29/2012

PercentSolids: 0 Station ID:

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	535			IS	2.5	5
7664-41-7	Ammonia	59			AS	0.02	0.25
7782-41-4	Fluoride	10	U		IC	3.3	10
1-00-5	Nitrate + Nitrite	<del>0.048</del> 0.1	US		AS	0.0022	0.1
14265-44-2	ortho-Phosphate-P	10	UJ	H-1	IC	2.4	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	93.2	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW03BDL1

Lab Code: PEL Case No.: SAS No: SDG No.: 3506439

Matrix: WATER Lab Sample ID: 350643904DL1

Level: (low/med) LOW Date Received: 6/29/2012

Percent Solids: 0 Station ID:

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
3-03-5	Sulfate	1540			IC	160	500

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	94.0	90 - 115	

Color Before: Clarity Before: Texture :

Color After : Clarity After: Artifacts:

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW03BDL2

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3506439Matrix: WATERLab Sample ID: 350643904DL2Level: (low/med) LOWDate Received: 6/29/2012Percent Solids: 0

Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	54400			IC		340	1000

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	96.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW903B

Lab Code: PEL Case No.: SAS No: SDG No.: 3506439

Matrix: WATER Lab Sample ID: 350643905

Level:(low/med) LOW Date Received: 6/29/2012

PercentSolids: 0 Station ID:

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	670			IS	5	10
7664-41-7	Ammonia	53.3			AS	0.02	0.25
7782-41-4	Fluoride	10	U		IC	3.3	10
1-00-5	Nitrate + Nitrite	<del>0.0497</del> 0.1	✓		AS	0.0022	0.1
14265-44-2	ortho-Phosphate-P	10	UJ	H-1	IC	2.4	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	93.6	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0 SMSMW903BDL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3506439

Matrix: WATER Lab Sample ID: 350643905DL1

Level: (low/med) LOW Date Received: 6/29/2012

Percent Solids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
3-03-5	Sulfate	1530			IC		160	500

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	93.2	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW903BDL2

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3506439Matrix: WATERLab Sample ID: 350643905DL2Level:(low/med) LOWDate Received: 6/29/2012Percent Solids: 0

Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	54200			IC		340	1000

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	97.8	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW04A

Lab Code: PEL Case No.: SAS No.: SDG No.: 3506439

Matrix: WATER Lab Sample ID: 350643906

Level:(low/med) LOW Date Received: 6/29/2012

PercentSolids: 0 Station ID:

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	270			IS	5	10
7664-41-7	Ammonia	37.6			AS	0.02	0.25
7782-41-4	Fluoride	10	U		IC	3.3	10
1-00-5	Nitrate + Nitrite	32.3			AS	0.0022	0.1
14265-44-2	ortho-Phosphate-P	10	UJ	H-1	IC	2.4	10
3-03-5	Sulfate	446			IC	3.2	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	102.6	90 - 115	

Color Before: Clarity Before: Texture :

Color After: Clarity After: Artifacts:

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW04ADL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3506439Matrix: WATERLab Sample ID: 350643906DL1Level:(low/med) LOWDate Received: 6/29/2012PercentSolids: 0

Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	7970			IC		68	200

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	93.7	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW07A

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3506439Matrix: WATER Lab Sample ID: 350643907Level: (low/med) LOW Date Received: 6/29/2012Percent Solids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
47752-0-60-0	Alkalinity (Total)	1360			IS		5	10
7664-41-7	Ammonia	254			AS		0.02	0.25
7782-41-4	Fluoride	10	U		IC		3.3	10
1-00-5	Nitrate + Nitrite	14.7			AS		0.0022	0.1
14265-44-2	ortho-Phosphate-P	10	UJ	H-1	IC		2.4	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	109.8	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW07ADL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3506439Matrix: WATER Lab Sample ID: 350643907DL1Level:(low/med) LOW Date Received: 6/29/2012PercentSolids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	23400			IC		170	500
3-03-5	Sulfate	1290			IC		160	500

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	94.4	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW07B

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3506439Matrix: WATER Lab Sample ID: 350643908Level: (low/med) LOW Date Received: 6/29/2012Percent Solids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	1060			IS	5	10
7664-41-7	Ammonia	456			AS	0.02	0.25
7782-41-4	Fluoride	10	U		IC	3.3	10
1-00-5	Nitrate + Nitrite	6.78			AS	0.0022	0.1
14265-44-2	ortho-Phosphate-P	10	UJ	H-1	IC	2.4	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	91.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW07BDL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3506439Matrix: WATER Lab Sample ID: 350643908DL1Level (low/med) LOW Date Received: 6/29/2012Percent Solids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
3-03-5	Sulfate	1160			IC		160	500

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	91.6	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:

---

---

---







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW07BDL2

Lab Code: PEL Case No.: SAS No: SDG No.: 3506439

Matrix: WATER Lab Sample ID: 350643908DL2

Level:(low/med) LOW Date Received: 6/29/2012

PercentSolids: 0 Station ID:

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
1-00-3	Chloride	47300			IC	340	1000

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	97.4	90 - 115	

Color Before: Clarity Before: Texture :

Color After : Clarity After: Artifacts:

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW08A

Lab Code: PEL Case No.: SAS No: SDG No.: 3506439

Matrix: WATER Lab Sample ID: 350643909

Level:(low/med) LOW Date Received: 6/29/2012

PercentSolids: 0 Station ID:

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
47752-0-60-0	Alkalinity (Total)	740			IS		10	20
7664-41-7	Ammonia	66.8			AS		0.02	0.25
7782-41-4	Fluoride	196	J	CLP02	IC		1.65	5
1-00-5	Nitrate + Nitrite	0.1	U		AS		0.0022	0.1
14265-44-2	ortho-Phosphate-P	5	UJ	H-1	IC		1.2	5
3-03-5	Sulfate	80.5			IC		1.6	5

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	95.2	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW08ADL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3506439Matrix: WATERLab Sample ID: 350643909DL1Level: (low/med) LOWDate Received: 6/29/2012Percent Solids: 0

Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	2120			IC		17	50

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	91.2	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW10A

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3506439Matrix: WATER Lab Sample ID: 350643910Level: (low/med) LOW Date Received: 6/29/2012Percent Solids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
47752-0-60-0	Alkalinity (Total)	1	U		IS		0.5	1
7664-41-7	Ammonia	0.25	U		AS		0.02	0.25
7782-41-4	Fluoride	108	J	CLP	IC		1.65	5
1-00-5	Nitrate + Nitrite	33.2			AS		0.0022	0.1
14265-44-2	ortho-Phosphate-P	5	UJ	H-1	IC		1.2	5

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	104.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0 SMSMW10ADL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3506439

Matrix: WATER Lab Sample ID: 350643910DL1

Level:(low/med) LOW Date Received: 6/29/2012

PercentSolids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	1480			IC		34	100
3-03-5	Sulfate	2680			IC		32	100

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	92.6	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:

---

---

---







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelter 073-0

SMSMW10B

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3506439Matrix: WATER Lab Sample ID: 350643911Level: (low/med) LOW Date Received: 6/29/2012Percent Solids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	455			IS	5	10
7664-41-7	Ammonia	0.178	J	<i>Q-2</i>	AS	0.02	0.25
1-00-3	Chloride	83			IC	8.5	25
7782-41-4	Fluoride	25	U		IC	8.25	25
1-00-5	Nitrate + Nitrite	3.76			AS	0.0022	0.1
14265-44-2	ortho-Phosphate-P	25	<i>UJ</i>	<i>H-1</i>	IC	6	25
3-03-5	Sulfate	900			IC	8	25

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	92.8	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc.

Contract: Smokey Mountain Smelter 073-0

SMSRB062812

Lab Code: PEL

Case No.:

SAS No:

SDG No.: 3506439

Matrix: WATER

Lab Sample ID: 350643912

Level: (low/med) LOW

Date Received: 6/29/2012

Percent Solids: 0

Station ID:

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	1	U		IS	0.5	1
7664-41-7	Ammonia	0.0477	J		AS	0.02	0.25
1-00-3	Chloride	0.93	J	Q-2	IC	0.34	1
7782-41-4	Fluoride	1	U		IC	0.33	1
1-00-5	Nitrate + Nitrite	<del>0.0058</del> 0.1	UJ		AS	0.0022	0.1
14265-44-2	ortho-Phosphate-P	1	UJ	H-1	IC	0.24	1
3-03-5	Sulfate	0.53	J	Q-2	IC	0.32	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	100.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mtn Smelter 073-01-019

SMSMW13A

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3509413Matrix: WATER Lab Sample ID: 350941301Level:(low/med) LOW Date Received: 6/6/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	7			IS	0.5	1
7664-41-7	Ammonia	0.568			AS	0.02	0.25
1-00-3	Chloride	385			IC	3.4	10
1-01-0	Residue, Filterable (TDS)	1060			GR	10	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	97.6	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mtn Smelter 073-01-019 SMSMW13B

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3509413

Matrix: WATER Lab Sample ID: 350941302

Level:(low/med) LOW Date Received: 6/6/2013

PercentSolids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
47752-0-60-0	Alkalinity (Total)	252			IS		0.5	1
7664-41-7	Ammonia	0.439			AS		0.02	0.25
1-00-3	Chloride	27.9			IC		0.34	1
1-01-0	Residue, Filterable (TDS)	530			GR		10	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	102.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:

---



---



---







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mtn Smelter 073-01-019 SMSMW12A

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3509413

Matrix: WATER Lab Sample ID: 350941303

Level:(low/med) LOW Date Received: 6/6/2013

PercentSolids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
47752-0-60-0	Alkalinity (Total)	343			IS		0.5	1
7664-41-7	Ammonia	0.612			AS		0.02	0.25
1-00-3	Chloride	350			IC		3.4	10
1-01-0	Residue, Filterable (TDS)	1390			GR		10	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	97.6	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mtn Smelter 073-01-019

SMSMW10A

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3509413Matrix: WATER Lab Sample ID: 350941304Level:(low/med) LOW Date Received: 6/6/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	1	U		IS	0.5	1
7664-41-7	Ammonia	0.441			AS	0.02	0.25
1-00-3	Chloride	1060			IC	17	50
1-01-0	Residue, Filterable (TDS)	4380			GR	10	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	97.6	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mtn Smelter 073-01-019

SMSMW11A

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3509413Matrix: WATER Lab Sample ID: 350941305Level: (low/med) LOW Date Received: 6/6/2013Percent Solids: 0

Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	1400			IS	2.5	5
7664-41-7	Ammonia	106			AS	0.02	0.25
1-00-3	Chloride	4370			IC	34	100
1-01-0	Residue, Filterable (TDS)	7940			GR	10	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	97.6	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mtn Smelter 073-01-019

SMSMW12B

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3509413Matrix: WATERLab Sample ID: 350941306Level:(low/med) LOWDate Received: 6/6/2013PercentSolids: 0

Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
47752-0-60-0	Alkalinity (Total)	288			IS		1	2
7664-41-7	Ammonia	0.997			AS		0.02	0.25
1-00-3	Chloride	434			IC		3.4	10
1-01-0	Residue, Filterable (TDS)	1690			GR		10	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	97.6	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mtn Smelter 073-01-019

SMSMW11B

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3509413Matrix: WATER Lab Sample ID: 350941307Level:(low/med) LOW Date Received: 6/6/2013PercentSolids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
47752-0-60-0	Alkalinity (Total)	1320			IS		2.5	5
7664-41-7	Ammonia	139			AS		0.02	0.25
1-00-3	Chloride	6310			IC		34	100
1-01-0	Residue, Filterable (TDS)	10700			GR		10	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	98.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mtn Smelter 073-01-019

SMSMW911B

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3509413Matrix: WATERLab Sample ID: 350941308Level:(low/med) LOWDate Received: 6/6/2013PercentSolids: 0

Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	1430			IS	2.5	5
7664-41-7	Ammonia	139			AS	0.02	0.25
1-00-3	Chloride	6270			IC	34	100
1-01-0	Residue, Filterable (TDS)	10800			GR	10	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	98.4	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_







April 14, 2014

Ms. Denise Goddard  
United States Environmental Protection Agency  
Science and Ecosystem Support Division  
980 College Station Road  
Athens, GA 30605-2720

Subject: Data Review and Validation  
Site Name: Smokey Mountain Smelters, Knoxville, TN  
Project No.: 14-0032  
ELEMENT Sample ID. Nos: NA  
Inorganic Analysis: Spectrum Analytical, Tampa, FL  
Date(s) Sampled: 11/12 – 14/13  
VTSR Date: 11/15/13  
Date Received from Lab: 03/18/14  
TDF No.: 14T0384

Dear Ms. Goddard:

The ESAT Work Team has reviewed the above-captioned data package consisting of adequate deliverables to document EPA Methods SW9060 for TOC; E310.1 for alkalinity; E350.1 for ammonia; E376.1 for sulfide; E300.1 for nitrate, nitrite, ortho-phosphate, fluoride, chloride, and sulfate; and E160.1 for total dissolved solids (TDS) for twenty-four water samples according to EPA guidelines. This package presents acceptable technical performance and generally met the standard for quality required by Region 4 except as detailed below.

Examination of laboratory blank samples revealed apparent low-level contamination with several analytes. Reported detection limits were adjusted as high as ten times the blank levels to discount possible false positives due to contamination in the laboratory and method blanks.

Holding times were missed for nitrate in SDGs 3511012, 3510993, and 3510976 due to the required dilutions. The samples were originally run within holding times but the dilutions were not.

Holding times were missed for all of the anions for five of the six samples in SDG 3511009. The laboratory received the samples within a few hours of holding times expiring. The FedEx shipping label indicates priority overnight delivery requested and it is not clear why the laboratory did not receive the samples until the second day.


Chemical oxygen demand was originally requested but later cancelled by the samplers.

The package appeared complete with the exception of sample raw data for TOC analyses in SDG 3510976.

A Stage 4 validation consisting of manual review was performed on the inorganic samples submitted for this case.

Further details are provided in the attached review summary form. Please feel free to contact this office if we can be of further service.

Very truly yours,

  
Sue Jones  
Chemist  
Alion Science and Technology  
ESAT Contractor, Region 4 EPA



# Inorganic Data Quality Assessment Record (DQAR)

Review Date:	4/9/14	Analyses:	TOC, NO3, NO2, PO4, SO4, F, Cl, NH3, Sulfide, Alk., TDS	Matrix:	Water	Project #:	14-0032
SDG /Lab File:	3511012, 3510993, 3510976, 3511009						
Laboratory	Spectrum Analytical, Tampa, FL						
Site Name:	Smokey Mountain Smelters, Knoxville, TN						
Check One:	EPA		ESAT		CLP	Other (specify)	Non-CLP (RAS)

Signatures: SJ

Reviewer

Review Codes: M- Metals, H- Mercury, C- Cyanide, O- Others

## Sample Numbers:

Water:		Soil/Sediment:	
SMSMW12A	SMSSW04		
SMSMW01A	SMSSW08		
SMSMW03B	SMSSW08SPRING		
SMSMW04A	SMSSW09		
SMSSW03	SMSSW09SPRING		
SMSSW13	SMSSW20		
SMSMW10B	SMSMW02A		
SMSMW11A	SMSMW07A		
SMSMW11B	SMSMW07B		
SMSMW12B	SMSMW08A		
SMSMW13B	SMSSW11		
SMSSW01	SMSSW14		

## I. SUMMARY OF PROBLEMS AND COMMENTS:

A summary of deficiencies noted for the methods used to generate data for this project is presented below. Please refer to the Data Quality Assessment Record (DQAR) for each data file and the data flag summary table at the end of this review document. For the purposes of this review, the QC limits specified in the analytical method have been applied to the data. Data qualifier recommendations are made in accordance with the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (Functional Guidelines), and the Region 4 SOP, Data Validation Standard Operating Procedures for Contract Laboratory Program Routine Analytical Services (R4DVSOP).

### Data Review Comments:

II. Data Quality Assessment (An explanation for any "no" answer must be provided)		Yes	N/A	No
1.	Summary			
	Were all requested analyses performed?	O		
	Were all required QC checks performed?	O		
	Were all required documents present?	O		O
	Were requested detection limits met?	?		
Remark: Project required detection limits are unknown. COD was originally scheduled but cancelled. In SDG 3510976, the raw TOC data provided did not include data for the sample runs in that SDG and so reported TOC results could not be verified against raw data.				
2.	Holding Times:(Holding times are not applicable for non-aqueous samples)	Yes	N/A	No
	Were water samples properly preserved?	O		
	Were water holding time requirements met?	O		O



Remark: Holding times for nitrate were missed in SDGs 3511012, 3510993, and 3510976. Holding times for anions were missed in SDG 3511009. Samples were "J" qualified.					
3.	Calibrations:		Yes	N/A	No
	A. Initial Calibration:				
	Were acceptable correlation coefficients obtained?		<input type="radio"/>		
	Were acceptable % Recoveries for analytes obtained?		<input type="radio"/>		
	B. Continuing Calibration				
	Were acceptable % Recoveries for analytes obtained?		<input type="radio"/>		
Remark: Evaluation was performed according to the laboratory calibration limits for these non-CLP analytes which are outside of the +- 10% customarily used for metals evaluation.					
4.	Blanks:		Yes	N/A	No
	Were any contaminants noted in the blanks?		<input type="radio"/>		<input type="radio"/>
	If yes, were blank rules applied to the data?		<input type="radio"/>		
Remark: 10X rule applied					
5.	ICP Interference Check Sample:		Yes	N/A	No
	Were results within 20% of the true value?			<input type="radio"/>	
	Were False positives Reported?			<input type="radio"/>	
	Were False negatives reported?			<input type="radio"/>	
Remark:					
6.	Matrix spikes:		Yes	N/A	No
	Was a matrix spike analysis performed?				<input type="radio"/>
	Were samples spiked at appropriate levels?				<input type="radio"/>
	Were matrix spike/matrix spike duplicate analyses performed?				<input type="radio"/>
	Were acceptable recoveries obtained?				<input type="radio"/>
	Was acceptable precision obtained?				<input type="radio"/>
Remark: There were no samples identified for MS/MSD analysis. LCS/LCSD recoveries and RPDs were used for accuracy and precision information.					
7.	Matrix duplicate analysis:		Yes	N/A	No
	Was a matrix duplicate analysis performed?				<input type="radio"/>
	Was duplicate precision in control?			<input type="radio"/>	
Remark: LCS/LCSD recoveries and RPDs were used for accuracy and precision information.					
8.	Performance Evaluation Sample (PES):		Yes	N/A	No
	Was a P.E.S. analyzed with the samples?				<input type="radio"/>
	If yes, were acceptable results obtained?				
Remark:					
9.	Method Standard / Laboratory Control Sample:		Yes	N/A	No
	Were acceptable recoveries obtained?		<input type="radio"/>		
	Was acceptable precision obtained?		<input type="radio"/>		
Remark:					



<b>10.</b>	ICP Serial Dilution Sample:		Yes	N/A	No
	Was ICP serial dilution analysis performed?				<b>O</b>
	Were diluted results within 10% of undiluted sample result?			<b>O</b>	
	Remark:				
<b>11.</b>	Completeness:		Yes	N/A	No
	Were all requested analyses performed?		<b>O</b>		
	Were all required documents present? If yes, were results provided?		<b>O</b>		
	Were results of calculation checks acceptable?		<b>O</b>		
	Remark:				



### Additional Comments:

### III. Data Qualifiers Summary

Based on a review of the quality control information, the following is a table summarizing the data qualifiers used by Region 4 for this data review report.

Recommended Data Qualifiers					
Case	NA	Project Number:	14-0032	ELEMENT Sample ID Nos.	NA
Site	Smokey Mountain Smelters, Knoxville, TN			Date:	3/24/14
Affected Samples	Analytes	Recommended Qualifiers		Reason	
SMSSW03	Ammonia	U, B-4		Raised RL due to blank contamination	
SMSSW01	Chloride	U, B-4		Raised RL due to blank contamination	
SMSSW01	Sulfate	U, B-4		Raised RL due to blank contamination	
SMSMW12A, SMSMW01A, SMSMW04A, SMSMW12B	Nitrate	J, H-6		Holding time missed for dilutions	
SMSMW02A, SMSMW07B, SMSMW08A, SMSSW11, SMSSW14	Anions via 300.1	J, H-1		Holding time missed	
SMSMW12A, SMSMW13B, SMSSW01, SMSSW04, SMSSW08, SMSSW08SPRING, SMSSW09, SMSSW09SPRING, SMSSW20, SMSSW11, SMSSW14	Ammonia	J, Q-2		Concentration <RL and >MDL	
SMSMW12A, SMSMW01A, SMSMW03B, SMSMW11A, SMSMW12B, SMSMW13B, SMSSW01, SMSSW08SPRING, SMSSW09, SMSSW09SPRING, SMSSW20, SMSMW02A, SMSMW08A, SMSSW11, SMSSW14	Sulfide	J, Q-2		Concentration <RL and >MDL	
SMSMW01A	Ortho-phosphate	J, Q-2		Concentration <RL and >MDL	
SMSSW03	Nitrate	J, Q-2		Concentration <RL and >MDL	
SMSSW03, SMSMW12B, SMSSW08, SMSSW08SPRING, SMSSW09, SMSSW11	Nitrite	J, Q-2		Concentration <RL and >MDL	
SMSSW13, SMSMW13B, SMSSW01, SMSSW09SPRING, SMSSW14	TOC	J, Q-2		Concentration <RL and >MDL	
SMSMW13B, SMSSW08SPRING, SMSSW09, SMSSW14	Fluoride	J, Q-2		Concentration <RL and >MDL	



May 16, 2014

Ms. Denise Goddard  
United States Environmental Protection Agency  
Science and Ecosystem Support Division  
980 College Station Road  
Athens, GA 30605-2720

Subject: Data Review and Validation  
Site Name: Smokey Mountain Smelters, Knoxville, TN  
Project No.: 14-0032  
ELEMENT Sample ID. Nos: NA  
Inorganic Analysis: Spectrum Analytical, Tampa, FL  
Date(s) Sampled: 11/12 – 14/13  
VTSR Date: 11/15/13  
Date Received from Lab: 03/18/14  
TDF No.: 14T0384

Dear Ms. Goddard:

The ESAT Work Team has reviewed the above-captioned data package consisting of adequate deliverables to document EPA Methods SW9060 for TOC; E310.1 for alkalinity; E350.1 for ammonia; E376.1 for sulfide; E300.1 for nitrate, nitrite, ortho-phosphate, fluoride, chloride, and sulfate; and E160.1 for total dissolved solids (TDS) for twenty-four water samples according to EPA guidelines. This package presents acceptable technical performance and generally met the standard for quality required by Region 4 except as detailed below.

Examination of laboratory blank samples revealed apparent low-level contamination with several analytes. Reported detection limits were adjusted as high as ten times the blank levels to discount possible false positives due to contamination in the laboratory and method blanks.

Holding times were missed for nitrate in SDGs 3511012, 3510993, and 3510976 due to the required dilutions. The samples were originally run within holding times but the dilutions were not.

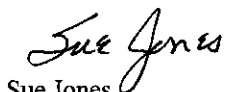
Holding times were missed for all of the anions for five of the six samples in SDG 3511009. The laboratory received the samples within a few hours of holding times expiring. The FedEx shipping label indicates priority overnight delivery requested and it is not clear why the laboratory did not receive the samples until the second day.

Chemical oxygen demand was originally requested but later cancelled by the samplers.

A Stage 4 validation consisting of manual review was performed on the inorganic samples submitted for this case.

Further details are provided in the attached review summary form. Please feel free to contact this office if we can be of further service.

Very truly yours,



Sue Jones  
Chemist  
Alion Science and Technology  
ESAT Contractor, Region 4 EPA







# Inorganic Data Quality Assessment Record (DQAR)

Review Date:	4/9/14	Analyses:	TOC, NO3, NO2, PO4, SO4, F, Cl, NH3, Sulfide, Alk., TDS	Matrix:	Water	Project #:	14-0032
SDG /Lab File:	3511012, 3510993, 3510976, 3511009						
Laboratory	Spectrum Analytical, Tampa, FL						
Site Name:	Smokey Mountain Smelters, Knoxville, TN						
Check One:	EPA		ESAT		CLP		Other (specify) Non-CLP (RAS)

Signatures: SJ

Reviewer

Review Codes: M- Metals, H- Mercury, C- Cyanide, O- Others

## Sample Numbers:

Water:		Soil/Sediment:	
SMSMW12A	SMSSW04		
SMSMW01A	SMSSW08		
SMSMW03B	SMSSW08SPRING		
SMSMW04A	SMSSW09		
SMSSW03	SMSSW09SPRING		
SMSSW13	SMSSW20		
SMSMW10B	SMSMW02A		
SMSMW11A	SMSMW07A		
SMSMW11B	SMSMW07B		
SMSMW12B	SMSMW08A		
SMSMW13B	SMSSW11		
SMSSW01	SMSSW14		

## I. SUMMARY OF PROBLEMS AND COMMENTS:

A summary of deficiencies noted for the methods used to generate data for this project is presented below. Please refer to the Data Quality Assessment Record (DQAR) for each data file and the data flag summary table at the end of this review document. For the purposes of this review, the QC limits specified in the analytical method have been applied to the data. Data qualifier recommendations are made in accordance with the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (Functional Guidelines), and the Region 4 SOP, Data Validation Standard Operating Procedures for Contract Laboratory Program Routine Analytical Services (R4DVSOP).

### Data Review Comments:

II. Data Quality Assessment (An explanation for any "no" answer must be provided)				
1.	Summary	Yes	N/A	No
	Were all requested analyses performed?	O		
	Were all required QC checks performed?	O		
	Were all required documents present?	O		O
	Were requested detection limits met?	?		
Remark: Project required detection limits are unknown. COD was originally scheduled but cancelled.				
2.	Holding Times:(Holding times are not applicable for non-aqueous samples)	Yes	N/A	No
	Were water samples properly preserved?	O		
	Were water holding time requirements met?	O		O
Remark: Holding times for nitrate were missed in SDGs 3511012, 3510993, and 3510976. Holding times for anions were				







missed in SDG 3511009. Samples were "J" qualified.					
3.	Calibrations:		Yes	N/A	No
	A. Initial Calibration:				
	Were acceptable correlation coefficients obtained?		O		
	Were acceptable % Recoveries for analytes obtained?		O		
	B. Continuing Calibration				
	Were acceptable % Recoveries for analytes obtained?		O		
	Remark: Evaluation was performed according to the laboratory calibration limits for these non-CLP analytes which are outside of the +- 10% customarily used for metals evaluation.				
4.	Blanks:		Yes	N/A	No
	Were any contaminants noted in the blanks?		O		O
	If yes, were blank rules applied to the data?		O		
	Remark: 10X rule applied				
5.	ICP Interference Check Sample:		Yes	N/A	No
	Were results within 20% of the true value?			O	
	Were False positives Reported?			O	
	Were False negatives reported?			O	
	Remark:				
6.	Matrix spikes:		Yes	N/A	No
	Was a matrix spike analysis performed?				O
	Were samples spiked at appropriate levels?				O
	Were matrix spike/matrix spike duplicate analyses performed?				O
	Were acceptable recoveries obtained?				O
	Was acceptable precision obtained?				O
	Remark: There were no samples identified for MS/MSD analysis. LCS/LCSD recoveries and RPDs were used for accuracy and precision information.				
7.	Matrix duplicate analysis:		Yes	N/A	No
	Was a matrix duplicate analysis performed?				O
	Was duplicate precision in control?			O	
	Remark: LCS/LCSD recoveries and RPDs were used for accuracy and precision information.				
8.	Performance Evaluation Sample (PES):		Yes	N/A	No
	Was a P.E.S. analyzed with the samples?				O
	If yes, were acceptable results obtained?				
	Remark:				
9.	Method Standard / Laboratory Control Sample:		Yes	N/A	No
	Were acceptable recoveries obtained?		O		
	Was acceptable precision obtained?		O		
	Remark:				







<b>10.</b>	ICP Serial Dilution Sample:		Yes	N/A	No
	Was ICP serial dilution analysis performed?				<b>O</b>
	Were diluted results within 10% of undiluted sample result?			<b>O</b>	
	Remark:				
<b>11.</b>	Completeness:		Yes	N/A	No
	Were all requested analyses performed?		<b>O</b>		
	Were all required documents present? If yes, were results provided?		<b>O</b>		
	Were results of calculation checks acceptable?		<b>O</b>		
	Remark:				







### Additional Comments:

### III. Data Qualifiers Summary

Based on a review of the quality control information, the following is a table summarizing the data qualifiers used by Region 4 for this data review report.

Recommended Data Qualifiers					
Case	NA	Project Number:	14-0032	ELEMENT Sample ID Nos.	NA
Site	Smokey Mountain Smelters, Knoxville, TN			Date:	3/24/14
Affected Samples	Analytes	Recommended Qualifiers		Reason	
SMSSW03	Ammonia	U, B-4		Raised RL due to blank contamination	
SMSSW01	Chloride	U, B-4		Raised RL due to blank contamination	
SMSSW01	Sulfate	U, B-4		Raised RL due to blank contamination	
SMSMW12A, SMSMW01A, SMSMW04A, SMSMW12B	Nitrate	J, H-6		Holding time missed for dilutions	
SMSMW02A, SMSMW07B, SMSMW08A, SMSSW11, SMSSW14	Anions via 300.1	J, H-1		Holding time missed	
SMSMW12A, SMSMW13B, SMSSW01, SMSSW04, SMSSW08, SMSSW08SPRING, SMSSW09, SMSSW09SPRING, SMSSW20, SMSSW11, SMSSW14	Ammonia	J, Q-2		Concentration <RL and >MDL	
SMSMW12A, SMSMW01A, SMSMW03B, SMSMW11A, SMSMW12B, SMSMW13B, SMSSW01, SMSSW08SPRING, SMSSW09, SMSSW09SPRING, SMSSW20, SMSMW02A, SMSMW08A, SMSSW11, SMSSW14	Sulfide	J, Q-2		Concentration <RL and >MDL	
SMSMW01A	Ortho-phosphate	J, Q-2		Concentration <RL and >MDL	
SMSSW03	Nitrate	J, Q-2		Concentration <RL and >MDL	
SMSSW03, SMSMW12B, SMSSW08, SMSSW08SPRING, SMSSW09, SMSSW11	Nitrite	J, Q-2		Concentration <RL and >MDL	
SMSSW13, SMSMW13B, SMSSW01, SMSSW09SPRING, SMSSW14	TOC	J, Q-2		Concentration <RL and >MDL	
SMSMW13B, SMSSW08SPRING, SMSSW09, SMSSW14	Fluoride	J, Q-2		Concentration <RL and >MDL	







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSMW12A

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3511012Matrix: WATER Lab Sample ID: 351101201Level:(low/med) LOW Date Received: 11/15/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	230			IS	5	10
7664-41-7	Ammonia	0.0557	J	P-2	AS	0.02	0.25
7782-41-4	Fluoride	1	U		IC	0.33	1
25-90-0	Nitrate-N	<del>20.8</del>	<del>E</del>		IC	0.036	0.1
15-90-0	Nitrite-N	0.1	U		IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	1460			GR	10	10
18496-25-8	Sulfide	0.2	J	P-2	T	0.08	2
1012_5	TOC	2.11			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	104.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

SMSMW12ADL1

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3511012Matrix: WATER Lab Sample ID: 351101201DL1Level: (low/med) LOW Date Received: 11/15/2013Percent Solids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
1-00-3	Chloride	338			IC	3.4	10
25-90-0	Nitrate-N	21.4	J,	H-6	IC	0.36	1
3-03-5	Sulfate	220			IC	3.2	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	91.6	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSMW01A

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3511012Matrix: WATER Lab Sample ID: 351101202Level:(low/med) LOW Date Received: 11/15/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	635			IS	2.5	5
7664-41-7	Ammonia	263			AS	0.02	0.25
25-90-0	Nitrate-N	<del>93.1</del>	<del>E</del>		IC	0.036	0.1
15-90-0	Nitrite-N	0.21			IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	0.92	J	Q-2	IC	0.24	1
1-01-0	Residue, Filterable (TDS)	32100			GR	10	10
18496-25-8	Sulfide	0.1	J	Q-2	T	0.08	2
1012_5	TOC	9.5			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	98.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

SMSMW01ADL1

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

Lab Code: PEL Case No.: SAS No: SDG No.: 3511012

Matrix: WATER Lab Sample ID: 351101202DL1

Level: (low/med) LOW Date Received: 11/15/2013

Percent Solids: 0 Station ID:

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE.	Concentration	C	Q	M	MDL	RL
7782-41-4	Fluoride	25	U		IC	8.25	25
25-90-0	Nitrate-N	97.5			IC	0.9	2.5
3-03-5	Sulfate	900			IC	8	25

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	100.0	90 - 115	

Color Before: Clarity Before: Texture :

Color After : Clarity After: Artifacts:

Comments:



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSMW01ADL2

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3511012Matrix: WATER Lab Sample ID: 351101202DL2Level:(low/med) LOW Date Received: 11/15/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	20000			IC		170	500
25-90-0	Nitrate-N	111	J	H-6	IC		18	50

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	95.2	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:







## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSMW03B

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3510993Matrix: WATER Lab Sample ID: 351099301Level:(low/med) LOW Date Received: 11/14/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	456			IS	1	2
7664-41-7	Ammonia	107			AS	0.02	0.25
7782-41-4	Fluoride	1	U		IC	0.33	1
25-90-0	Nitrate-N	0.1	U		IC	0.036	0.1
15-90-0	Nitrite-N	0.1	U		IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	96700			GR	10	10
18496-25-8	Sulfide	1	J	4-2	T	0.08	2
1012_5	TOC	19.3			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	92.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

SMSMW03BDL1

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

Lab Code: PEL Case No.: SAS No.: SDG No.: 3510993

Matrix: WATER Lab Sample ID: 351099301DL1

Level: (low/med) LOW Date Received: 11/14/2013

Percent Solids: 0 Station ID:

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
3-03-5	Sulfate	706			IC	3.2	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	94.8	90 - 115	

Color Before: Clarity Before: Texture :

Color After : Clarity After: Artifacts:

Comments:



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSMW03BDL2

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510993Matrix: WATER Lab Sample ID: 351099301DL2Level:(low/med) LOW Date Received: 11/14/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	52100			IC		340	1000

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	90.2	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSMW04A

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510993Matrix: WATER Lab Sample ID: 351099302Level:(low/med) LOW Date Received: 11/14/2013PercentSolids: 0 Station ID: \_\_\_\_\_

## CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	140			IS	2.5	5
7664-41-7	Ammonia	57.3			AS	0.02	0.25
7782-41-4	Fluoride	3.3			IC	0.33	1
<del>25-99-0</del>	<del>Nitrate-N</del>	<del>29.4</del>	<del>E</del>		IC	0.036	0.1
15-90-0	Nitrite-N	0.1	U		IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	23200			GR	10	10
18496-25-8	Sulfide	2	U		T	0.08	2
1012_5	TOC	4.36			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	98.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSMW04ADL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510993Matrix: WATER Lab Sample ID: 351099302DL1Level:(low/med) LOW Date Received: 11/14/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
25-90-0	Nitrate-N	32.4	J,	H-6	IC		0.36	1
3-03-5	Sulfate	578			IC		3.2	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	92.2	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSMW04ADL2

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510993Matrix: WATER Lab Sample ID: 351099302DL2Level:(low/med) LOW Date Received: 11/14/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
1-00-3	Chloride	13400			IC	170	500

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	92.8	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSSW03

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510993Matrix: WATER Lab Sample ID: 351099303Level:(low/med) LOW Date Received: 11/14/2013PercentSolids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
47752-0-60-0	Alkalinity (Total)	255			IS		2.5	5
7664-41-7	Ammonia	0.252	U	B-4	AS		0.02	0.25
7782-41-4	Fluoride	8.4			IC		0.33	1
25-90-0	Nitrate-N	0.069	J	Q-2	IC		0.036	0.1
15-90-0	Nitrite-N	0.064	J	Q-2	IC		0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC		0.24	1
1-01-0	Residue, Filterable (TDS)	1110			GR		10	10
3-03-5	Sulfate	9			IC		0.32	1
18496-25-8	Sulfide	2	U		T		0.08	2
1012_5	TOC	20.6			TC		0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	94.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSSW03DL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510993Matrix: WATER Lab Sample ID: 351099303DL1Level: (low/med) LOW Date Received: 11/14/2013Percent Solids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	346			IC		3.4	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	90.6	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSSW13

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3510993Matrix: WATER Lab Sample ID: 351099304Level: (low/med) LOW Date Received: 11/14/2013Percent Solids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	190			IS	2.5	5
7664-41-7	Ammonia	<del>0.035</del> <u>0.25</u> <u>u x</u>		<del>Q-2</del>	AS	0.02	0.25
7782-41-4	Fluoride	1	U		IC	0.33	1
25-90-0	Nitrate-N	1.4			IC	0.036	0.1
15-90-0	Nitrite-N	0.1	U		IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	576			GR	10	10
3-03-5	Sulfate	19.2			IC	0.32	1
18496-25-8	Sulfide	2	U		T	0.08	2
1012_5	TOC	0.804	J	<u>Q-2</u>	TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	94.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSSW13DL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510993Matrix: WATER Lab Sample ID: 351099304DL1Level:(low/med) LOW Date Received: 11/14/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	155			IC		3.4	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	90.4	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE

SMSMW10B

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510976Matrix: WATER Lab Sample ID: 351097601Level:(low/med) LOW Date Received: 11/13/2013Percent Solids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	403			IS	0.5	1
7664-41-7	Ammonia	0.25	U		AS	0.02	0.25
1-00-3	Chloride	77.3			IC	0.34	1
7782-41-4	Fluoride	8.3			IC	0.33	1
25-90-0	Nitrate-N	2.9			IC	0.036	0.1
15-90-0	Nitrite-N	0.1	U		IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	2430			GR	10	10
18496-25-8	Sulfide	2	U		T	0.08	2
1012_5	TOC	1.36			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	90.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE

SMSMW10BDL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510976Matrix: WATERLab Sample ID: 351097601DL1Level: (low/med) LOWDate Received: 11/13/2013Percent Solids: 0

Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
3-03-5	Sulfate	782			IC		8	25

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	90.4	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE

SMSMW11A

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510976Matrix: WATER Lab Sample ID: 351097602Level: (low/med) LOW Date Received: 11/13/2013Percent Solids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	1300			IS	0.5	1
7664-41-7	Ammonia	88.2			AS	0.02	0.25
25-90-0	Nitrate-N	3			IC	0.036	0.1
15-90-0	Nitrite-N	0.1	U		IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	11500			GR	10	10
18496-25-8	Sulfide	0.2	J	Q-2	T	0.16	4
1012_5	TOC	20.4			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	100.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

SMSMW11ADL1

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE

Lab Code: PEL Case No.: SAS No: SDG No.: 3510976

Matrix: WATER Lab Sample ID: 351097602DL1

Level:(low/med) LOW Date Received: 11/13/2013

PercentSolids: 0 Station ID:

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
7782-41-4	Fluoride	159			IC	3.3	10
3-03-5	Sulfate	186			IC	3.2	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	90.0	90 - 115	

Color Before: Clarity Before: Texture :

Color After : Clarity After: Artifacts:

Comments:



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE EPA Sample No.  
SMSMW11ADL2

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510976

Matrix: WATER Lab Sample ID: 351097602DL2

Level:(low/med) LOW Date Received: 11/13/2013

PercentSolids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	3660			IC		34	100

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	94.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE SMSMW11B

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3510976

Matrix: WATER Lab Sample ID: 351097603

Level:(low/med) LOW Date Received: 11/13/2013

PercentSolids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
47752-0-60-0	Alkalinity (Total)	1480			IS		0.5	1
7664-41-7	Ammonia	99.1			AS		0.02	0.25
25-90-0	Nitrate-N	2.4			IC		0.036	0.1
15-90-0	Nitrite-N	0.1	U		IC		0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC		0.24	1
1-01-0	Residue, Filterable (TDS)	11400			GR		10	10
18496-25-8	Sulfide	2	U		T		0.08	2
1012_5	TOC	21.5			TC		0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	102.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE

SMSMW11BDL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510976Matrix: WATER Lab Sample ID: 351097603DL1Level:(low/med) LOW Date Received: 11/13/2013PercentSolids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
7782-41-4	Fluoride	144			IC		3.3	10
3-03-5	Sulfate	206			IC		3.2	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	91.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:

---

---

---



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE

SMSMW118DL2

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510976Matrix: WATER Lab Sample ID: 351097603DL2Level: (low/med) LOW Date Received: 11/13/2013Percent Solids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	4610			IC		34	100

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	90.4	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE

SMSMW12B

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3510976Matrix: WATER Lab Sample ID: 351097604Level:(low/med) LOW Date Received: 11/13/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	410			IS	0.5	1
7664-41-7	Ammonia	0.382			AS	0.02	0.25
7782-41-4	Fluoride	1	U		IC	0.33	1
25-90-0	<del>Nitrate-N</del>	<del>15.8</del>	<del>E</del>		IC	0.036	0.1
15-90-0	Nitrite-N	0.044	J	Q-2	IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	3160			GR	10	10
18496-25-8	Sulfide	0.1	J	Q-2	T	0.08	2
1012_5	TOC	2.2			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	100.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE SMSMW12BDL1  
Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510976  
Matrix: WATER Lab Sample ID: 351097604DL1  
Level:(low/med) LOW Date Received: 11/13/2013  
PercentSolids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	368			IC		3.4	10
25-90-0	Nitrate-N	15.8		<i>J.H.B</i>	IC		0.36	1
3-03-5	Sulfate	212			IC		3.2	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	90.2	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE

SMSMW13B

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510976Matrix: WATER Lab Sample ID: 351097605Level: (low/med) LOW Date Received: 11/13/2013Percent Solids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	175			IS	0.5	1
7664-41-7	Ammonia	0.0832	J	Q-2	AS	0.02	0.25
1-00-3	Chloride	31.7			IC	0.34	1
7782-41-4	Fluoride	0.42	J	Q-2	IC	0.33	1
25-90-0	Nitrate-N	1.7			IC	0.036	0.1
15-90-0	Nitrite-N	0.1	U		IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	848			GR	10	10
18496-25-8	Sulfide	0.2	J	Q-2	T	0.08	2
1012_5	TOC	0.633	J	Q-2	TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	98.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE

SMSMW13BDL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510976Matrix: WATER Lab Sample ID: 351097605DL1Level:(low/med) LOW Date Received: 11/13/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
3-03-5	Sulfate	112			IC		1.6	5

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	90.4	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE

SMSSW01

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3510976Matrix: WATER Lab Sample ID: 351097606Level:(low/med) LOW Date Received: 11/13/2013PercentSolids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-80-0	Alkalinity (Total)	164			IS	0.5	1
7664-41-7	Ammonia	0.055	J	Q-2	AS	0.02	0.25
1-00-3	Chloride	3.7	U, B-4		IC	0.34	1
7782-41-4	Fluoride	1	U		IC	0.33	1
25-90-0	Nitrate-N	0.48			IC	0.036	0.1
15-90-0	Nitrite-N	0.11			IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	270			GR	10	10
3-03-5	Sulfate	4	U, B-4		IC	0.32	1
18496-25-8	Sulfide	0.1	J	Q-2	T	0.08	2
1012_5	TOC	0.696	J	Q-2	TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	94.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:

---



---



---



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE SMSSW04

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3510976

Matrix: WATER Lab Sample ID: 351097607

Level:(low/med) LOW Date Received: 11/13/2013

PercentSolids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	235			IS	0.5	1
7664-41-7	Ammonia	0.0769	J	Q-2	AS	0.02	0.25
7782-41-4	Fluoride	7.3			IC	0.33	1
25-90-0	Nitrate-N	0.1	U		IC	0.036	0.1
15-90-0	Nitrite-N	0.16			IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	7320			GR	10	10
3-03-5	Sulfate	71.2			IC	0.32	1
18496-25-8	Sulfide	2	U		T	0.08	2
1012_5	TOC	4.42			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	96.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE SMSSW04DL1  
Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3510976  
Matrix: WATER Lab Sample ID: 351097607DL1  
Level: (low/med) LOW Date Received: 11/13/2013  
Percent Solids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	1230			IC		17	50

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	90.4	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE

SMSSW08

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3510976Matrix: WATER Lab Sample ID: 351097608Level: (low/med) LOW Date Received: 11/13/2013Percent Solids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	255			IS	0.5	1
7664-41-7	Ammonia	0.0822	J	Q-2	AS	0.02	0.25
7782-41-4	Fluoride	1	U		IC	0.33	1
25-90-0	Nitrate-N	2			IC	0.036	0.1
15-90-0	Nitrite-N	0.045	J	Q-2	IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	2980			GR	10	10
3-03-5	Sulfate	33.3			IC	0.32	1
18496-25-8	Sulfide	2	U		T	0.08	2
1012_5	TOC	1.38			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	96.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE SMSSW08DL1  
Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510976  
Matrix: WATER Lab Sample ID: 351097608DL1  
Level:(low/med) LOW Date Received: 11/13/2013  
PercentSolids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	420			IC		3.4	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	95.8	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_  
Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

SMSSW08SPRING

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTELab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510976Matrix: WATER Lab Sample ID: 351097609Level: (low/med) LOW Date Received: 11/13/2013Percent Solids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	280			IS	0.5	1
7664-41-7	Ammonia	0.142	J	Q-2	AS	0.02	0.25
7782-41-4	Fluoride	0.43	J	Q-2	IC	0.33	1
25-90-0	Nitrate-N	2.6			IC	0.036	0.1
15-90-0	Nitrite-N	0.039	J	Q-2	IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	3420			GR	10	10
3-03-5	Sulfate	36			IC	0.32	1
18496-25-8	Sulfide	0.2	J	Q-2	T	0.08	2
1012_5	TOC	1.23			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	94.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE SMSSW08SPRINGDL1  
Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510976  
Matrix: WATER Lab Sample ID: 351097609DL1  
Level:(low/med) LOW Date Received: 11/13/2013  
PercentSolids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	451			IC		3.4	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	95.2	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE

SMSSW09

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3510976Matrix: WATER Lab Sample ID: 351097610Level:(low/med) LOW Date Received: 11/13/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	240			IS	0.5	1
7664-41-7	Ammonia	0.0496	J	Q-2	AS	0.02	0.25
7782-41-4	Fluoride	0.43	J	Q-2	IC	0.33	1
25-90-0	Nitrate-N	2.6			IC	0.036	0.1
15-90-0	Nitrite-N	0.047	J	Q-2	IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	2640			GR	10	10
3-03-5	Sulfate	34			IC	0.32	1
18496-25-8	Sulfide	0.401	J	Q-2	T	0.08	2
1012_5	TOC	1.28			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	96.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE

SMSSW09DL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510976Matrix: WATERLab Sample ID: 351097610DL1Level:(low/med) LOWDate Received: 11/13/2013PercentSolids: 0

Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	406			IC		3.4	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	98.8	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE

SMSSW09SPRING

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3510976Matrix: WATER Lab Sample ID: 351097611Level:(low/med) LOW Date Received: 11/13/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-80-0	Alkalinity (Total)	250			IS	0.5	1
7664-41-7	Ammonia	0.0658	J	Q-2	AS	0.02	0.25
7782-41-4	Fluoride	.1	U		IC	0.33	1
25-90-0	Nitrate-N	1			IC	0.036	0.1
15-90-0	Nitrite-N	0.1	U		IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	584			GR	10	10
3-03-5	Sulfate	17.8			IC	0.32	1
18496-25-8	Sulfide	0.2	J	Q-2	T	0.08	2
1012_5	TOC	0.795	J	Q-2	TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	94.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE SMSSW09SPRINGDL1  
Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3510976  
Matrix: WATER Lab Sample ID: 351097611DL1  
Level:(low/med) LOW Date Received: 11/13/2013  
PercentSolids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	131			IC		1.7	5

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	91.6	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: SMOKEY MOUNTAIN SMELTE

SMSSW20

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3510976Matrix: WATER Lab Sample ID: 351097612Level: (low/med): LOW Date Received: 11/13/2013Percent Solids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	155			IS	0.5	1
7664-41-7	Ammonia	0.0677	J	Q-2	AS	0.02	0.25
1-00-3	Chloride	58.8			IC	0.34	1
7782-41-4	Fluoride	1	U		IC	0.33	1
25-90-0	Nitrate-N	0.2			IC	0.036	0.1
15-90-0	Nitrite-N	0.1	U		IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	308			GR	10	10
3-03-5	Sulfate	12.2			IC	0.32	1
18496-25-8	Sulfide	0.2	J	Q-2	T	0.08	2
1012_5	TOC	1.72			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	94.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSMW02A

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3511009Matrix: WATER Lab Sample ID: 351100901Level: (low/med) LOW Date Received: 11/15/2013Percent Solids: 0 Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	1050			IS	5	10
7664-41-7	Ammonia	80.4			AS	0.02	0.25
25-90-0	Nitrate-N	0.1	U	J, H-1	IC	0.036	0.1
15-90-0	Nitrite-N	1.6	J	H-1	IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1.2	J	H-1	IC	0.24	1
1-01-0	Residue, Filterable (TDS)	5890			GR	10	10
3-03-5	Sulfate	1	UJ	H-1	IC	0.32	1
18496-25-8	Sulfide	0.802	J	Q-2	T	0.08	2
1012_5	TOC	233			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	110.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

SMSMW02ADL1

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3511009Matrix: WATER Lab Sample ID: 351100901DL1Level:(low/med) LOW Date Received: 11/15/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
7782-41-4	Fluoride	253	J,	H-1	IC	8.25	25

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacétate - DCA	100.8	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSMW02ADL2

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3511009Matrix: WATER Lab Sample ID: 351100901DL2Level: (low/med) LOW Date Received: 11/15/2013Percent Solids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	2560	J,	H-1	IC		17	50

Surrögate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	93.2	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

SMSMW07A

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3511009Matrix: WATER Lab Sample ID: 351100902Level:(low/med) LOW Date Received: 11/15/2013PercentSolids: 0 Station ID: \_\_\_\_\_

## CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	1110			IS	5	10
7664-41-7	Ammonia	242			AS	0.02	0.25
7782-41-4	Fluoride	1	U		IC	0.33	1
25-90-0	Nitrate-N	3.2			IC	0.036	0.1
15-90-0	Nitrite-N	0.1	U		IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U		IC	0.24	1
1-01-0	Residue, Filterable (TDS)	65400			GR	10	10
18496-25-8	Sulfide	4	U		T	0.16	4
1012_5	TOC	31.1			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	112.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

SMSMW07ADL1

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3511009Matrix: WATER Lab Sample ID: 351100902DL1Level:(low/med) LOW Date Received: 11/15/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
3-03-5	Sulfate	426			IC		3.2	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	95.6	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSMW07ADL2

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3511009Matrix: WATERLab Sample ID: 351100902DL2Level:(low/med) LOWDate Received: 11/15/2013PercentSolids: 0

Station ID: \_\_\_\_\_

CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	44800			IC		340	1000

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	90.4	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

SMSMW07B

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3511009Matrix: WATER Lab Sample ID: 351100903Level:(low/med) LOW Date Received: 11/15/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	1140			IS	5	10
7664-41-7	Ammonia	47.7			AS	0.02	0.25
25-90-0	Nitrate-N	9.4	J	H-1	IC	0.036	0.1
15-90-0	Nitrite-N	0.1	UJ	H-1	IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	J	H-1	IC	0.24	1
1-01-0	Residue, Filterable (TDS)	33800			GR	10	10
18496-25-8	Sulfide	2	U		T	0.08	2
1012_5	TOC	26.3			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	112.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSMW07BDL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3511009Matrix: WATER Lab Sample ID: 351100903DL1Level:(low/med) LOW Date Received: 11/15/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
7782-41-4	Fluoride	25	UJ	H-1	IC		8.25	25
3-03-5	Sulfate	1140	J	H-1	IC		8	25

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	97.6	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSMW07BDL2

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3511009Matrix: WATER Lab Sample ID: 351100903DL2Level:(low/med) LOW Date Received: 11/15/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	24200	J	H-1	IC		170	500

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	92.8	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

SMSMW08A

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3511009Matrix: WATER Lab Sample ID: 351100904Level:(low/med) LOW Date Received: 11/15/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
47752-0-60-0	Alkalinity (Total)	820			IS		10	20
7664-41-7	Ammonia	507			AS		0.02	0.25
25-90-0	Nitrate-N	0.1	UJ	H-1	IC		0.036	0.1
15-90-0	Nitrite-N	0.21	J	H-1	IC		0.031	0.1
14265-44-2	ortho-Phosphate-P	1.2	J	H-1	IC		0.24	1
1-01-0	Residue, Filterable (TDS)	4570			GR		10	10
18496-25-8	Sulfide	0.2	J	Q-2	T		0.08	2
1012_5	TOC	16.8			TC		0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	92.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSMW08ADL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3511009Matrix: WATER Lab Sample ID: 351100904DL1Level:(low/med) LOW Date Received: 11/15/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
7782-41-4	Fluoride	192	J	H-1	IC		8.25	25
3-03-5	Sulfate	86.1	J	H-1	IC		8	25

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	94.4	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

SMSMW08ADL2

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3511009Matrix: WATER Lab Sample ID: 351100904DL2Level: (low/med) LOW Date Received: 11/15/2013Percent Solids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M		MDL	RL
1-00-3	Chloride	2030	J	H-1	IC		17	50

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	91.6	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSSW11

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3511009Matrix: WATER Lab Sample ID: 351100905Level:(low/med) LOW Date Received: 11/15/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	220			IS	10	20
7664-41-7	Ammonia	0.197	J	Q-2	AS	0.02	0.25
1-00-3	Chloride	9.2	J	H-1	IC	0.34	1
7782-41-4	Fluoride	1	UJ	H-1	IC	0.33	1
25-90-0	Nitrate-N	0.73	J	H-1	IC	0.036	0.1
15-90-0	Nitrite-N	0.037	J	Q-2 H-1	IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	UJ	H-1	IC	0.24	1
1-01-0	Residue, Filterable (TDS)	400			GR	10	10
3-03-5	Sulfate	7.9	J	H-1	IC	0.32	1
18496-25-8	Sulfide	0.2	J	Q-2	T	0.08	2
1012_5	TOC	1.13			TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	92.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

SMSSW14

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-Lab Code: PEL Case No.: \_\_\_\_\_ SAS No: \_\_\_\_\_ SDG No.: 3511009Matrix: WATER Lab Sample ID: 351100906Level:(low/med) LOW Date Received: 11/15/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE.	Concentration	C	Q	M	MDL	RL
47752-0-60-0	Alkalinity (Total)	195			IS	2.5	5
7664-41-7	Ammonia	0.155	J	4-2	AS	0.02	0.25
7782-41-4	Fluoride	0.4	J	4-2, H-1	IC	0.33	1
25-90-0	Nitrate-N	1.2	J	H-1	IC	0.036	0.1
15-90-0	Nitrite-N	0.1	U, J	H-1	IC	0.031	0.1
14265-44-2	ortho-Phosphate-P	1	U, J	H-1	IC	0.24	1
1-01-0	Residue, Filterable (TDS)	494			GR	10	10
3-03-5	Sulfate	16.6	J	H-1	IC	0.32	1
18496-25-8	Sulfide	0.401	J	4-2	T	0.08	2
1012_5	TOC	0.771	J	4-2	TC	0.31	1

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	108.0	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:



## U.S. EPA - CLP

1

## INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: Spectrum Analytical, Inc. Contract: Smokey Mountain Smelters 073-

SMSSW14DL1

Lab Code: PEL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: 3511009Matrix: WATER Lab Sample ID: 351100906DL1Level:(low/med) LOW Date Received: 11/15/2013PercentSolids: 0 Station ID: \_\_\_\_\_CONCENTRATION UNITS: MG/L

CAS NO.	ANALYTE	Concentration	C	Q	M	MDL	RL
1-00-3	Chloride	128	J	H-I	IC	3.4	10

Surrogate	Recovery	Control Limits	Qualifier
Dichloroacetate - DCA	90.8	90 - 115	

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture : \_\_\_\_\_

Color After : \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_







August 21, 2014

Ms. Denise Goddard  
United States Environmental Protection Agency  
Science and Ecosystem Support Division  
980 College Station Road  
Athens, GA 30605-2720

Subject: Data Review and Validation  
Site Name: Smokey Mountain Smelters, Knoxville, TN  
Project No.: DG-0818  
ELEMENT Sample ID. Nos: NA  
Inorganic Analysis: TestAmerica, Savannah, GA  
Date(s) Sampled: 3/4/14 - 3/5/14  
VTSR Date: 3/6/14  
Date Received from Lab:  
TDF No.: 14T0812

Dear Ms. Goddard:

The ESAT Work Team has reviewed the above-captioned data package consisting of adequate deliverables to document EPA Methods 2320B for alkalinity; E350.1 for ammonia; E300.1 for fluoride, chloride, sulfate, nitrate and nitrite; E365.1 for ortho-phosphate; 5310B for total organic carbon (TOC); 2540C for total dissolved solids (TDS); 7196A for hexavalent chromium; and 4500 for sulfide for 21 water samples according to EPA guidelines. This package presents acceptable technical performance and generally met the standard for quality required by Region 4 except as detailed below.

Examination of laboratory blank samples revealed apparent low-level contamination with ammonia, hexavalent chromium, and ortho-phosphate. Reported detection limits were adjusted as high as ten times the blank levels to discount possible false positives due to contamination in the method blanks.

Holding times were missed for ortho-phosphate for almost all samples and for nitrate/nitrite and chromium in select samples. See the Data Qualifiers Summary for additional details. These results were "J" qualified (H-1 or H-6).

Matrix spike recovery was high for ammonia in sample SMSSW08 SPRING. The positive ammonia result for this sample was considered estimated and "J" qualified (QM-2).

A Stage 4 validation consisting of manual review was performed on the inorganic samples submitted for this case.

Further details are provided in the attached review summary form. Please feel free to contact this office if we can be of further service.

Very truly yours,

Sue Jones  
Chemist  
Alion Science and Technology  
ESAT Contractor, Region 4 EPA



## Inorganic Data Quality Assessment Record (DQAR)

Review Date:	8/21/14	Analyses:	NO3, NO2, o-PO4, SO4, F, Cl, NH3, Alk., TDS, TOC, Sulfide, Cr <sup>+6</sup>			Matrix:	Water		Project #:	DG-0818
SDG /Lab File:		680-99116 & 680-99170								
Laboratory		TestAmerica, Savannah, GA								
Site Name:		Smokey Mountain Smelters, Knoxville, TN								
Check One:		EPA		ESAT		CLP		Other (specify)	Non-CLP (RAS)	

Signatures: SJ

Reviewer

Review Codes: M- Metals, O- Others

### Sample Numbers:

Water:			Soil/Sediment:	
SMSMW12B	SMSSW04			
SMSMW07A	SMSSW12			
SMSMW13B	SMSMW08A			
SMSSW20	SMSMW03B			
SMSMW11A	SMSMW02A			
SMSMW07B	SMSMW12A			
SMSSW02	SMSSW03			
SMSSW10	SMSMW04A			
SMSMW11B	SMSMW01A			
SMSMW13A				
SMSSW08				
SMSSW08 SPRING				

## I. SUMMARY OF PROBLEMS AND COMMENTS:

A summary of deficiencies noted for the methods used to generate data for this project is presented below. Please refer to the Data Quality Assessment Record (DQAR) for each data file and the data flag summary table at the end of this review document. For the purposes of this review, the QC limits specified in the analytical method have been applied to the data. Data qualifier recommendations are made in accordance with the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (Functional Guidelines), and the Region 4 SOP, Data Validation Standard Operating Procedures for Contract Laboratory Program Routine Analytical Services (R4DVSOP).

### Data Review Comments:

	II. Data Quality Assessment (An explanation for any "no" answer must be provided)				
1.	Summary		Yes	N/A	No
	Were all requested analyses performed?		O, M		
	Were all required QC checks performed?		O, M		
	Were all required documents present?		O, M		
	Were requested detection limits met?		?		
Remark: Project required detection limits are unknown.					
2.	Holding Times:(Holding times are not applicable for non-aqueous samples)		Yes	N/A	No
	Were water samples properly preserved?		O, M		
	Were water holding time requirements met?		O, M		O, M



	Remark: Holding times were missed for o-phosphate, chromium, and nitrate/nitrite. Affected samples were "J" qualified.				
<b>3.</b>	Calibrations:		Yes	N/A	No
	A. Initial Calibration:				
	Were acceptable correlation coefficients obtained?		<b>O, M</b>		
	Were acceptable % Recoveries for analytes obtained?		<b>O, M</b>		
	B. Continuing Calibration				
	Were acceptable % Recoveries for analytes obtained?		<b>O, M</b>		
	Remark: Evaluation was performed according to the laboratory calibration limits for these non-CLP analytes which are outside of the +/- 10% customarily used for metals evaluation.				
<b>4.</b>	Blanks:		Yes	N/A	No
	Were any contaminants noted in the blanks?		<b>O, M</b>		<b>O</b>
	If yes, were blank rules applied to the data?		<b>O, M</b>		
	Remark: 10X rule applied				
<b>5.</b>	ICP Interference Check Sample:		Yes	N/A	No
	Were results within 20% of the true value?			<b>O, M</b>	
	Were False positives Reported?			<b>O, M</b>	
	Were False negatives reported?			<b>O, M</b>	
	Remark:				
<b>6.</b>	Matrix spikes:		Yes	N/A	No
	Was a matrix spike analysis performed?		<b>O, M</b>		<b>O</b>
	Were samples spiked at appropriate levels?		<b>O, M</b>		<b>O</b>
	Were matrix spike/matrix spike duplicate analyses performed?		<b>O, M</b>		<b>O</b>
	Were acceptable recoveries obtained?		<b>O, M</b>		<b>O</b>
	Was acceptable precision obtained?		<b>O, M</b>		<b>O</b>
	Remark: MS/MSD was performed for all analytes except alkalinity, TDS, and sulfide. For these methods, LCS/LCSD recoveries and RPDs were used for accuracy and precision information.				
<b>7.</b>	Matrix duplicate analysis:		Yes	N/A	No
	Was a matrix duplicate analysis performed?		<b>O</b>		<b>M</b>
	Was duplicate precision in control?		<b>O</b>		<b>M</b>
	Remark: Duplicate was performed for alkalinity and sulfide.				
<b>8.</b>	Performance Evaluation Sample (PES):		Yes	N/A	No
	Was a P.E.S. analyzed with the samples?				<b>O, M</b>
	If yes, were acceptable results obtained?				
	Remark:				
<b>9.</b>	Method Standard / Laboratory Control Sample:		Yes	N/A	No
	Were acceptable recoveries obtained?		<b>O, M</b>		
	Was acceptable precision obtained?		<b>O, M</b>		
	Remark:				



<b>10.</b>	ICP Serial Dilution Sample:		Yes	N/A	No
	Was ICP serial dilution analysis performed?				<b>O, M</b>
	Were diluted results within 10% of undiluted sample result?			<b>O, M</b>	
	Remark:				
<b>11.</b>	Completeness:		Yes	N/A	No
	Were all requested analyses performed?		<b>O, M</b>		
	Were all required documents present? If yes, were results provided?		<b>O, M</b>		
	Were results of calculation checks acceptable?		<b>O, M</b>		
	Remark:				



## Additional Comments:

### III. Data Qualifiers Summary

Based on a review of the quality control information, the following is a table summarizing the data qualifiers used by Region 4 for this data review report.

Recommended Data Qualifiers					
Case	NA	Project Number:	DG-0818	ELEMENT Sample ID Nos.	NA
Site	Smokey Mountain Smelters, Knoxville, TN			Date:	8/21/2014
Affected Samples		Analytes	Recommended Qualifiers	Reason	
SMSSW08 SPRING		Ammonia	J, QM-2	Matrix spike recovery above control limits	
SMSMW12B, SMSSW10, SMSMW04A		Fluoride	J, Q-2	Concentration <RL and >MDL	
SMSMW11B, SMSMW13A, SMSMW07A, SMSMW13B, SMSSW20, SMSMW11A, SMSMW07B, SMSSW10, SMSSW02, SMSSW08, SMSSW08 SPRING		o-PO <sup>4</sup>	J, H-1	Holding time missed	
SMSMW13A, SMSMW12B, SMSSW08, SMSSW04, SMSSW12		TOC	J, Q-2	Concentration <RL and >MDL	
SMSMW13A, SMSMW12B, SMSSW20, SMSSW10, SMSSW08, SMSSW04		Ammonia	U, B-4	Sample result >RL but <10X blank value	
SMSMW11B, SMSMW13A, SMSMW12A		Cr	J, H-1	Holding time missed	
SMSMW12A		Cr	J, Q-2	Concentration <RL and >MDL	
SMSMW07A, SMSMW03B		NO <sup>3</sup>	J, H-6	Dilution or reanalysis ran out of holding time	
SMSMW03B		NO <sup>2</sup>	J, H-6	Dilution or reanalysis ran out of holding time	
SMSMW07A, SMSSW20, SMSSW08, SMSSW04, SMSSW12		o-PO <sup>4</sup>	J, Q-2	Concentration <RL and >MDL	
SMSSW02, SMSSW08 SPRING, SMSMW08A, SMSMW12A		NO <sup>2</sup>	J, Q-2	Concentration <RL and >MDL	



## TIME TRACKER

### VERSION 4.1

CASE # :	NA	PROJECT #:	DG-0818	TDF NO:	14T0812
LAB METHOD(S):	EPA SOW	LIMS METHOD CODE(S):	1100		
NUMBER OF SAMPLES:	21	VALIDATED TIME OF SAMPLE RECEIPT (VTSR):	3/6/14	DUE DATE:	8/28/14
SITE NAME:	Smokey Mountain Smelters, Knoxville, TN			SITE ID:	A4MD
PROGRAM:	SARA	TASK ORDER: 4	Work Order:		Box 14-065
STAGE OR PERSON		INITIALS	DATE ACCEPTED	COMPLETION DATE	# Hours
1.	Received by EPA QAS				
2.	Evidentiary Audit				
3.	Data Reviewer/Spreadsheet Data Entry	SKJ	8/14/14	8/21/14	14
4.	Secondary Review/Spreadsheet Verification (memo, entry, content)				
5.	Element Import				
6.	Task Monitor (Overview /data distribution)				

### Sample and Method Information

EPA Samples # (Separated by methods for cases with multiple lab methods applied)	V	SV	Pest./ PCBs	PCDD/ PCDF	Metals		CN	OTHERS (specified) NO3, NO2, o-PO4, SO4, F, Cl, NH3, Alk., TDS, TOC, Sulfide, Cr <sup>6</sup>
					ICP/AES	ICP/MS		
								21

**Notes/Comments:**



May 21, 2014

Ms. Denise Goddard  
United States Environmental Protection Agency  
Science and Ecosystem Support Division  
980 College Station Road  
Athens, GA 30605-2720

Subject: Data Review and Validation  
Site Name: Smokey Mountain Smelters, Knoxville, TN  
Project No.: DG-0520  
ELEMENT Sample ID. Nos: NA  
Inorganic Analysis: TestAmerica, Savannah, GA  
Date(s) Sampled: 3/3/14  
VTSR Date: 3/5/14  
Date Received from Lab:  
TDF No.: 14T0547

Dear Ms. Goddard:

The ESAT Work Team has reviewed the above-captioned data package consisting of adequate deliverables to document EPA Methods 2320B for alkalinity; E350.1 for ammonia; E300.1 for fluoride, chloride, sulfate, nitrate and nitrite; E365.1 for ortho-phosphate; 5310B for total organic carbon (TOC); 2540C for total dissolved solids (TDS); and 4500 for sulfide for eight water samples according to EPA guidelines. This package presents acceptable technical performance and generally met the standard for quality required by Region 4 except as detailed below.

Examination of laboratory blank samples revealed apparent low-level contamination with ammonia and ortho-phosphate. Reported detection limits were adjusted as high as ten times the blank levels to discount possible false positives due to contamination in the method blanks.

Holding times were missed for ortho-phosphate for all samples and for nitrate/nitrite for SMSSW10 and SMSSW09. These results were "J" qualified (H-1).

A Stage 4 validation consisting of manual review was performed on the inorganic samples submitted for this case.

Further details are provided in the attached review summary form. Please feel free to contact this office if we can be of further service.

Very truly yours,



Sue Jones  
Chemist  
Alion Science and Technology  
ESAT Contractor, Region 4 EPA







# Inorganic Data Quality Assessment Record (DQAR)

<b>Review Date:</b>	5/21/14	<b>Analyses:</b>	NO3, NO2, o-PO4, SO4, F, Cl, NH3, Alk., TDS, TOC, Sulfide	<b>Matrix:</b>	Water	<b>Project #:</b>	DG-0520
<b>SDG /Lab File:</b>	680-99111						
<b>Laboratory</b>	TestAmerica, Savannah, GA						
<b>Site Name:</b>	Smokey Mountain Smelters, Knoxville, TN						
<b>Check One:</b>	EPA	ESAT	CLP	Other (specify)	Non-CLP (RAS)		

Signatures: SJ

Reviewer

Review Codes: M- Metals, H- Mercury, C- Cyanide, O- Others

## Sample Numbers:

Water:	Soil/Sediment:
SMSSW01	
SMSMW10A	
SMSMW10B	
SMSSW11	
SMSSW14	
SMSSW13	
SMSSW09SPRING	
SMSSW09	

## I. SUMMARY OF PROBLEMS AND COMMENTS:

A summary of deficiencies noted for the methods used to generate data for this project is presented below. Please refer to the Data Quality Assessment Record (DQAR) for each data file and the data flag summary table at the end of this review document. For the purposes of this review, the QC limits specified in the analytical method have been applied to the data. Data qualifier recommendations are made in accordance with the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (Functional Guidelines), and the Region 4 SOP, Data Validation Standard Operating Procedures for Contract Laboratory Program Routine Analytical Services (R4DVSOP).

### Data Review Comments:

II. Data Quality Assessment (An explanation for any "no" answer must be provided)		Yes	N/A	No
1.	Summary	Yes	N/A	No
	Were all requested analyses performed?	O		
	Were all required QC checks performed?	O		
	Were all required documents present?	O		
	Were requested detection limits met?	?		
Remark: Project required detection limits are unknown.				
2.	Holding Times:(Holding times are not applicable for non-aqueous samples)	Yes	N/A	No
	Were water samples properly preserved?	O		
	Were water holding time requirements met?	O		O







Remark: Holding times were missed for o-phosphate and nitrate/nitrite. Affected samples were "J" qualified.					
3.	Calibrations:		Yes	N/A	No
	A. Initial Calibration:				
	Were acceptable correlation coefficients obtained?		O		
	Were acceptable % Recoveries for analytes obtained?		O		
	B. Continuing Calibration				
	Were acceptable % Recoveries for analytes obtained?		O		
Remark: Evaluation was performed according to the laboratory calibration limits for these non-CLP analytes which are outside of the +/- 10% customarily used for metals evaluation.					
4.	Blanks:		Yes	N/A	No
	Were any contaminants noted in the blanks?		O		O
	If yes, were blank rules applied to the data?		O		
Remark: 10X rule applied					
5.	ICP Interference Check Sample:		Yes	N/A	No
	Were results within 20% of the true value?			O	
	Were False positives Reported?			O	
	Were False negatives reported?			O	
Remark:					
6.	Matrix spikes:		Yes	N/A	No
	Was a matrix spike analysis performed?		O		O
	Were samples spiked at appropriate levels?		O		O
	Were matrix spike/matrix spike duplicate analyses performed?		O		O
	Were acceptable recoveries obtained?		O		O
	Was acceptable precision obtained?		O		O
Remark: MS/MSD was only performed for method 300.1. For all other methods, LCS/LCSD recoveries and RPDs were used for accuracy and precision information.					
7.	Matrix duplicate analysis:		Yes	N/A	No
	Was a matrix duplicate analysis performed?		O		
	Was duplicate precision in control?		O		
Remark:					
8.	Performance Evaluation Sample (PES):		Yes	N/A	No
	Was a P.E.S. analyzed with the samples?				O
	If yes, were acceptable results obtained?				
Remark:					
9.	Method Standard / Laboratory Control Sample:		Yes	N/A	No
	Were acceptable recoveries obtained?		O		
	Was acceptable precision obtained?		O		
Remark:					







<b>10.</b>	ICP Serial Dilution Sample:		Yes	N/A	No
	Was ICP serial dilution analysis performed?				<b>O</b>
	Were diluted results within 10% of undiluted sample result?			<b>O</b>	
	Remark:				
<b>11.</b>	Completeness:		Yes	N/A	No
	Were all requested analyses performed?		<b>O</b>		
	Were all required documents present? If yes, were results provided?		<b>O</b>		
	Were results of calculation checks acceptable?		<b>O</b>		
	Remark:				







### Additional Comments:

### III. Data Qualifiers Summary

Based on a review of the quality control information, the following is a table summarizing the data qualifiers used by Region 4 for this data review report.

Recommended Data Qualifiers					
Case	NA	Project Number:	DG-0520	ELEMENT Sample ID Nos.	NA
Site	Smokey Mountain Smelters, Knoxville, TN			Date:	5/21/2014
Affected Samples	Analytes		Recommended Qualifiers		Reason
SMSSW01, SMSSW09	NO3/NO2		J, H-1		Holding time missed
SMSSW01, SMSSW11, SMSSW09SPRING,	Fluoride		J, Q-2		Concentration <RL and >MDL
SMSSW01, SMSMW10A, SMSMW10B, SMSSW11, SMSSW14, SMSSW13, SMSSW09SPRING, SMSSW09	o-PO4		J, H-1		Holding time missed
SMSSW09SPRING	TOC		J, Q-2		Concentration <RL and >MDL
SMSSW01, SMSMW10A, SMSMW10B, SMSSW11, SMSSW14, SMSSW13, SMSSW09SPRING, SMSSW09	Ammonia		U, B-4		Sample result <10X blank value







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Savannah</u>	Job No.: <u>680-99111-1</u>
SDG No.: <u>68099111-1</u>	
Client Sample ID: <u>SMSSW01</u>	Lab Sample ID: <u>680-99111-1</u>
Matrix: <u>Water</u>	Lab File ID: <u>0314142037-17.d</u>
Analysis Method: <u>300.0</u>	Date Collected: <u>03/03/2014 11:17</u>
Extraction Method: _____	Date Extracted: _____
Sample wt/vol: <u>1(mL)</u>	Date Analyzed: <u>03/14/2014 20:37</u>
Con. Extract Vol.: <u>1(mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>25(uL)</u>	GC Column: <u>Dionex AS18</u> ID: <u>4 (mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>319822</u>	Units: <u>mg/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
14808-79-8	Sulfate	4.9		0.50	0.25
16984-48-8	Fluoride	0.057	J, 4-2	0.10	0.025
16887-00-6	Chloride	1.9		0.50	0.25







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSMW10A Lab Sample ID: 680-99111-2  
Matrix: Water Lab File ID: 0316141417-17.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 14:30  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 1 (mL) Date Analyzed: 03/16/2014 14:17  
Con. Extract Vol.: 1 (mL) Dilution Factor: 50  
Injection Volume: 25 (uL) GC Column: Dionex AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 319850 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
14808-79-8	Sulfate	1700		25	13
16984-48-8	Fluoride	73		5.0	1.3
16887-00-6	Chloride	850		25	13







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSMW10B Lab Sample ID: 680-99111-3  
Matrix: Water Lab File ID: 0314142138-21.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 14:50  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 1 (mL) Date Analyzed: 03/14/2014 21:38  
Con. Extract Vol.: 1 (mL) Dilution Factor: 4  
Injection Volume: 25 (uL) GC Column: Dionex AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 319822 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
16984-48-8	Fluoride	9.0		0.40	0.10
16887-00-6	Chloride	66		2.0	1.0







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSMW10B Lab Sample ID: 680-99111-3  
Matrix: Water Lab File ID: 0316141433-18.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 14:50  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 1(mL) Date Analyzed: 03/16/2014 14:33  
Con. Extract Vol.: 1(mL) Dilution Factor: 25  
Injection Volume: 25(uL) GC Column: Dionex AS18 ID: 4(mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 319850 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
14808-79-8	Sulfate	600		13	6.3







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSSW11 Lab Sample ID: 680-99111-4  
Matrix: Water Lab File ID: 0314142153-22.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 13:20  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 1(mL) Date Analyzed: 03/14/2014 21:53  
Con. Extract Vol.: 1(mL) Dilution Factor: 1  
Injection Volume: 25(uL) GC Column: Dionex AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 319822 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
14808-79-8	Sulfate	9.3		0.50	0.25
16984-48-8	Fluoride	0.081	J, 4-2	0.10	0.025
16887-00-6	Chloride	5.6		0.50	0.25







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSSW14 Lab Sample ID: 680-99111-5  
Matrix: Water Lab File ID: 0314142239-25.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 14:15  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 1(mL) Date Analyzed: 03/14/2014 22:39  
Con. Extract Vol.: 1(mL) Dilution Factor: 1  
Injection Volume: 25(uL) GC Column: Dionex AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 319822 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
14808-79-8	Sulfate	14		0.50	0.25
16984-48-8	Fluoride	0.51		0.10	0.025







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSSW14 Lab Sample ID: 680-99111-5  
Matrix: Water Lab File ID: 0316141448-19.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 14:15  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 1 (mL) Date Analyzed: 03/16/2014 14:48  
Con. Extract Vol.: 1 (mL) Dilution Factor: 2  
Injection Volume: 25 (uL) GC Column: Dionex AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 319850 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
16887-00-6	Chloride	51		1.0	0.50







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSSW13 Lab Sample ID: 680-99111-6  
Matrix: Water Lab File ID: 0314142255-26.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 14:50  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 1(mL) Date Analyzed: 03/14/2014 22:55  
Con. Extract Vol.: 1(mL) Dilution Factor: 1  
Injection Volume: 25(uL) GC Column: Dionex AS18 ID: 4(mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 319822 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
14808-79-8	Sulfate	17		0.50	0.25
16984-48-8	Fluoride	0.71		0.10	0.025







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSSW13 Lab Sample ID: 680-99111-6  
Matrix: Water Lab File ID: 0316141503-20.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 14:50  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 1 (mL) Date Analyzed: 03/16/2014 15:03  
Con. Extract Vol.: 1 (mL) Dilution Factor: 4  
Injection Volume: 25 (uL) GC Column: Dionex AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 319850 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
16887-00-6	Chloride	71		2.0	1.0







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSSW09 SPRING Lab Sample ID: 680-99111-7  
Matrix: Water Lab File ID: 0314142340-29.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 15:45  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 1(mL) Date Analyzed: 03/14/2014 23:40  
Con. Extract Vol.: 1(mL) Dilution Factor: 1  
Injection Volume: 25(uL) GC Column: Dionex AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup:(Y/N) N  
Analysis Batch No.: 319822 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
14808-79-8	Sulfate	15		0.50	0.25
16984-48-8	Fluoride	0.097	J, 0-2	0.10	0.025







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSSW09 SPRING Lab Sample ID: 680-99111-7  
Matrix: Water Lab File ID: 0316141549-23.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 15:45  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 1(mL) Date Analyzed: 03/16/2014 15:49  
Con. Extract Vol.: 1(mL) Dilution Factor: 2  
Injection Volume: 25(uL) GC Column: Dionex AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 319850 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
16887-00-6	Chloride	64		1.0	0.50







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSSW09 Lab Sample ID: 680-99111-8  
Matrix: Water Lab File ID: 0314142356-30.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 10:10  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 1 (mL) Date Analyzed: 03/14/2014 23:56  
Con. Extract Vol.: 1 (mL) Dilution Factor: 1  
Injection Volume: 25 (uL) GC Column: Dionex AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 319822 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
14808-79-8	Sulfate	18		0.50	0.25
16984-48-8	Fluoride	0.86		0.10	0.025







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSSW09 Lab Sample ID: 680-99111-8  
Matrix: Water Lab File ID: 0316141605-24.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 10:10  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 1 (mL) Date Analyzed: 03/16/2014 16:05  
Con. Extract Vol.: 1 (mL) Dilution Factor: 4  
Injection Volume: 25 (uL) GC Column: Dionex AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 319850 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
16887-00-6	Chloride	100		2.0	1.0







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSSW01 Lab Sample ID: 680-99111-1  
Matrix: Water Lab File ID: 0305142246-48.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 11:17  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 5 (mL) Date Analyzed: 03/05/2014 22:46  
Con. Extract Vol.: 5 (mL) Dilution Factor: 2  
Injection Volume: 25 (uL) GC Column: AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 318426 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
STL00673	Nitrite as NO2	<0.16	H-1, <i>Ja</i>	0.34	0.16
STL00672	Nitrate as NO3	1.2	H-1, <i>J</i>	0.44	0.22







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSMW10A Lab Sample ID: 680-99111-2  
Matrix: Water Lab File ID: 0305141332-12.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 14:30  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 5 (mL) Date Analyzed: 03/05/2014 13:32  
Con. Extract Vol.: 5 (mL) Dilution Factor: 4  
Injection Volume: 25 (uL) GC Column: AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 318425 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
STL00673	Nitrite as NO2	<0.33	<u>u</u>	0.68	0.33







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSMW10A Lab Sample ID: 680-99111-2  
Matrix: Water Lab File ID: 0305141316-11.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 14:30  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 5 (mL) Date Analyzed: 03/05/2014 13:16  
Con. Extract Vol.: 5 (mL) Dilution Factor: 40  
Injection Volume: 25 (uL) GC Column: AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 318425 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
STL00672	Nitrate as NO3	79		8.8	4.4







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSMW10B Lab Sample ID: 680-99111-3  
Matrix: Water Lab File ID: 0305141347-13.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 14:50  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 5 (mL) Date Analyzed: 03/05/2014 13:47  
Con. Extract Vol.: 5 (mL) Dilution Factor: 2  
Injection Volume: 25 (uL) GC Column: AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 318425 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
STL00673	Nitrite as NO2	<0.16	<u>u</u>	0.34	0.16
STL00672	Nitrate as NO3	11		0.44	0.22







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSSW11 Lab Sample ID: 680-99111-4  
Matrix: Water Lab File ID: 0305141245-9.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 13:20  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 5(mL) Date Analyzed: 03/05/2014 12:45  
Con. Extract Vol.: 5(mL) Dilution Factor: 2  
Injection Volume: 25(uL) GC Column: AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 318425 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
STL00673	Nitrite as NO2	<0.16	<u>u</u>	0.34	0.16
STL00672	Nitrate as NO3	4.0		0.44	0.22







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSSW14 Lab Sample ID: 680-99111-5  
Matrix: Water Lab File ID: 0305141301-10.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 14:15  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 5 (mL) Date Analyzed: 03/05/2014 13:01  
Con. Extract Vol.: 5 (mL) Dilution Factor: 2  
Injection Volume: 25 (uL) GC Column: AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 318425 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
STL00673	Nitrite as NO2	<0.16	<u>u</u>	0.34	0.16
STL00672	Nitrate as NO3	3.8		0.44	0.22







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSSW13 Lab Sample ID: 680-99111-6  
Matrix: Water Lab File ID: 0305141402-14.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 14:50  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 5 (mL) Date Analyzed: 03/05/2014 14:02  
Con. Extract Vol.: 5 (mL) Dilution Factor: 2  
Injection Volume: 25 (uL) GC Column: AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 318425 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
STL00673	Nitrite as NO2	<0.16	<u>u</u>	0.34	0.16
STL00672	Nitrate as NO3	4.0		0.44	0.22







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
SDG No.: 68099111-1  
Client Sample ID: SMSSW09 SPRING Lab Sample ID: 680-99111-7  
Matrix: Water Lab File ID: 0305141418-15.d  
Analysis Method: 300.0 Date Collected: 03/03/2014 15:45  
Extraction Method: \_\_\_\_\_ Date Extracted: \_\_\_\_\_  
Sample wt/vol: 5(mL) Date Analyzed: 03/05/2014 14:18  
Con. Extract Vol.: 5(mL) Dilution Factor: 2  
Injection Volume: 25(uL) GC Column: AS18 ID: 4 (mm)  
% Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
Analysis Batch No.: 318425 Units: mg/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
STL00673	Nitrite as NO2	<0.16	<u>u</u>	0.34	0.16
STL00672	Nitrate as NO3	3.6		0.44	0.22







FORM I  
HPLC/IC ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Savannah</u>	Job No.: <u>680-99111-1</u>
SDG No.: <u>68099111-1</u>	
Client Sample ID: <u>SMSSW09</u>	Lab Sample ID: <u>680-99111-8</u>
Matrix: <u>Water</u>	Lab File ID: <u>0305142302-49.d</u>
Analysis Method: <u>300.0</u>	Date Collected: <u>03/03/2014 10:10</u>
Extraction Method: _____	Date Extracted: _____
Sample wt/vol: <u>5 (mL)</u>	Date Analyzed: <u>03/05/2014 23:02</u>
Con. Extract Vol.: <u>5 (mL)</u>	Dilution Factor: <u>2</u>
Injection Volume: <u>25 (uL)</u>	GC Column: <u>AS18</u> ID: <u>4 (mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>318426</u>	Units: <u>mg/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
STL00673	Nitrite as NO2	<0.16	H-1, <u>4.5</u>	0.34	0.16
STL00672	Nitrate as NO3	4.6	H-1, <u>5</u>	0.44	0.22







1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY

Client Sample ID: SMSSW01

Lab Sample ID: 680-99111-1

Lab Name: TestAmerica Savannah

Job No.: 680-99111-1

SDG ID.: 68099111-1

Matrix: Water

Date Sampled: 03/03/2014 11:17

Reporting Basis: WET

Date Received: 03/05/2014 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7664-41-7	Ammonia	0.079	0.050	0.026	mg/L	4, B-4		1	350.1
14265-44-2	ortho-Phosphate	0.05 <del>0.027</del>	0.050	0.016	mg/L	45,	H-1	1	365.1
7440-44-0	Total Organic Carbon	3.1	1.0	0.50	mg/L			1	5310 B-2011







1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY

Client Sample ID: SMSSW01

Lab Sample ID: 680-99111-1

Lab Name: TestAmerica Savannah

Job No.: 680-99111-1

SDG ID.: 68099111-1

Matrix: Water

Date Sampled: 03/03/2014 11:17

Reporting Basis: WET

Date Received: 03/05/2014 10:15

CAS No.	Analyte	Result	RL		Units	C	Q	DIL	Method
18496-25-8	Sulfide	<1.0	1.0		mg/L		u	1	4500 S2. F-2011
	Alkalinity	56	5.0		mg/L			1	2320B-20 11
	Total Dissolved Solids	150	5.0		mg/L			1	2540C-20 11







1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY

Client Sample ID: SMSMW10A

Lab Sample ID: 680-99111-2

Lab Name: TestAmerica Savannah

Job No.: 680-99111-1

SDG ID.: 68099111-1

Matrix: Water

Date Sampled: 03/03/2014 14:30

Reporting Basis: WET

Date Received: 03/05/2014 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7664-41-7	Ammonia	0.071 <del>0.071</del>	0.050	0.026	mg/L	u, B-4		1	350.1
14265-44-2	ortho-Phosphate	0.05 <del>0.042</del>	0.050	0.016	mg/L	u, H-1		1	365.1
7440-44-0	Total Organic Carbon	1.9	1.0	0.50	mg/L			1	5310 B-2011







IB-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY

Client Sample ID: SMSMW10A

Lab Sample ID: 680-99111-2

Lab Name: TestAmerica Savannah

Job No.: 680-99111-1

SDG ID.: 68099111-1

Matrix: Water

Date Sampled: 03/03/2014 14:30

Reporting Basis: WET

Date Received: 03/05/2014 10:15

CAS No.	Analyte	Result	RL		Units	C	Q	DIL	Method
18496-25-8	Sulfide	<1.0	1.0		mg/L	u		1	4500 S2 F-2011
	Alkalinity	<5.0	5.0		mg/L	u		1	2320B-20 11
	Total Dissolved Solids	4300	50		mg/L			1	2540C-20 11







1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY

Client Sample ID: SMSMW10B Lab Sample ID: 680-99111-3  
 Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
 SDG ID.: 68099111-1  
 Matrix: Water Date Sampled: 03/03/2014 14:50  
 Reporting Basis: WET Date Received: 03/05/2014 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7664-41-7	Ammonia	0.17	0.050	0.026	mg/L	<u>U, B-H</u>		1	350.1
14265-44-2	ortho-Phosphate	<0.016	0.050	0.016	mg/L	<u>UJ</u>	<u>H-1</u>	1	365.1
7440-44-0	Total Organic Carbon	<0.50	1.0	0.50	mg/L	<u>U</u>		1	5310 B-2011







IB-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY

Client Sample ID: SMSMW10B

Lab Sample ID: 680-99111-3

Lab Name: TestAmerica Savannah

Job No.: 680-99111-1

SDG ID.: 68099111-1

Matrix: Water

Date Sampled: 03/03/2014 14:50

Reporting Basis: WET

Date Received: 03/05/2014 10:15

CAS No.	Analyte	Result	RL		Units	C	Q	DIL	Method
18496-25-8	Sulfide	<1.0	1.0		mg/L	u		1	4500 S2 F-2011
	Alkalinity	380	5.0		mg/L			1	2320B-20 11
	Total Dissolved Solids	1300	10		mg/L			1	2540C-20 11







1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY

Client Sample ID: SMSSW11 Lab Sample ID: 680-99111-4  
 Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
 SDG ID.: 680991111-1  
 Matrix: Water Date Sampled: 03/03/2014 13:20  
 Reporting Basis: WET Date Received: 03/05/2014 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7664-41-7	Ammonia	0.21	0.050	0.026	mg/L	U, B-4		1	350.1
14265-44-2	ortho-Phosphate	<del>0.05</del> <del>0.040</del>	0.050	0.016	mg/L	U, H-1		1	365.1
7440-44-0	Total Organic Carbon	4.1	1.0	0.50	mg/L			1	5310 B-2011







1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY

Client Sample ID: SMSSW11

Lab Sample ID: 680-99111-4

Lab Name: TestAmerica Savannah

Job No.: 680-99111-1

SDG ID.: 68099111-1

Matrix: Water

Date Sampled: 03/03/2014 13:20

Reporting Basis: WET

Date Received: 03/05/2014 10:15

CAS No.	Analyte	Result	RL		Units	C	Q	DIL	Method
18496-25-8	Sulfide	<1.0	1.0		mg/L	u		1	4500 S2 F-2011
	Alkalinity	110	5.0		mg/L			1	2320B-20 11
	Total Dissolved Solids	150	10		mg/L			1	2540C-20 11







1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY

Client Sample ID: SMSSW14

Lab Sample ID: 680-99111-5

Lab Name: TestAmerica Savannah

Job No.: 680-99111-1

SDG ID.: 68099111-1

Matrix: Water

Date Sampled: 03/03/2014 14:15

Reporting Basis: WET

Date Received: 03/05/2014 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7664-41-7	Ammonia	0.088	0.050	0.026	mg/L	u, B-4		1	350.1
14265-44-2	ortho-Phosphate	0.05 <del>0.037</del>	0.050	0.016	mg/L	u J, H-1		1	365.1
7440-44-0	Total Organic Carbon	2.6	1.0	0.50	mg/L			1	5310 8-2011







1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY

Client Sample ID: SMSEW14 Lab Sample ID: 680-99111-5  
 Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
 SDG ID.: 68099111-1  
 Matrix: Water Date Sampled: 03/03/2014 14:15  
 Reporting Basis: WET Date Received: 03/05/2014 10:15

CAS No.	Analyte	Result	RL		Units	C	Q	DIL	Method
18496-25-8	Sulfide	<1.0	1.0		mg/L	<i>u</i>		1	4500 S2 F-2011
	Alkalinity	120	5.0		mg/L			1	2320B-20 11
	Total Dissolved Solids	270	10		mg/L			1	2540C-20 11







1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY

Client Sample ID: SMSSW13

Lab Sample ID: 680-99111-6

Lab Name: TestAmerica Savannah

Job No.: 680-99111-1

SDG ID.: 68099111-1

Matrix: Water

Date Sampled: 03/03/2014 14:50

Reporting Basis: WET

Date Received: 03/05/2014 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7664-41-7	Ammonia	0.11	0.050	0.026	mg/L	u, B-4		1	350.1
14265-44-2	ortho-Phosphate	0.05 - 0.036	0.050	0.016	mg/L	u J	H-1	1	365.1
7440-44-0	Total Organic Carbon	2.3	1.0	0.50	mg/L			1	5310 B-2011







1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY

Client Sample ID: SMSSW13

Lab Sample ID: 680-99111-6

Lab Name: TestAmerica Savannah

Job No.: 680-99111-1

SDG ID.: 68099111-1

Matrix: Water

Date Sampled: 03/03/2014 14:50

Reporting Basis: WET

Date Received: 03/05/2014 10:15

CAS No.	Analyte	Result	RL		Units	C	Q	DIL	Method
18496-25-8	Sulfide	<1.0	1.0		mg/L	u		1	4500 S2 F-2011
	Alkalinity	120	5.0		mg/L			1	2320B-20 11
	Total Dissolved Solids	290	10		mg/L			1	2540C-20 11







1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY

Client Sample ID: SMSSW09 SPRING

Lab Sample ID: 680-99111-7

Lab Name: TestAmerica Savannah

Job No.: 680-99111-1

SDG ID.: 68099111-1

Matrix: Water

Date Sampled: 03/03/2014 15:45

Reporting Basis: WET

Date Received: 03/05/2014 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7664-41-7	Ammonia	0.11	0.050	0.026	mg/L	U, B-4		1	350.1
14265-44-2	ortho-Phosphate	<0.016	0.050	0.016	mg/L	U, J, H-1		1	365.1
7440-44-0	Total Organic Carbon	0.72	1.0	0.50	mg/L	J, Q-2		1	5310 B-2011







1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY

Client Sample ID: SMSSW09 Lab Sample ID: 680-99111-8  
 Lab Name: TestAmerica Savannah Job No.: 680-99111-1  
 SDG ID.: 68099111-1  
 Matrix: Water Date Sampled: 03/03/2014 10:10  
 Reporting Basis: WET Date Received: 03/05/2014 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7664-41-7	Ammonia	0.097	0.050	0.026	mg/L	U, B-2		1	350.1
14265-44-2	ortho-Phosphate	0.05 <del>0.023</del>	0.050	0.016	mg/L	U, J, H-1		1	365.1
7440-44-0	Total Organic Carbon	2.6	1.0	0.50	mg/L			1	5310 B-2011







1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY

Client Sample ID: SMSSW09

Lab Sample ID: 680-99111-8

Lab Name: TestAmerica Savannah

Job No.: 680-99111-1

SDG ID.: 68099111-1

Matrix: Water

Date Sampled: 03/03/2014 10:10

Reporting Basis: WET

Date Received: 03/05/2014 10:15

CAS No.	Analyte	Result	RL		Units	C	Q	DIL	Method
18496-25-8	Sulfide	<1.0	1.0		mg/L	u		1	4500 S2 F-2011
	Alkalinity	130	5.0		mg/L			1	2320B-20 11
	Total Dissolved Solids	380	10		mg/L			1	2540C-20 11







## Project 14-0103

May 22, 2014

Ms. Denise Goddard  
Environmental Protection Agency, Region 4  
Science and Ecosystem Support Division  
980 College Station Road  
Athens, GA 30605-2720

SUBJECT: Data Review and Validation  
Case No. NA  
Sample Nos.

Project No. 14-0103  
ESAT TDF No. 14T0401  
SMSSV8-15 (reference),  
SMSSV1-5, SMSSV2-10, SMSSV92-10,  
SMSSV3-10, SMSSV5-7, SMSSV9-10,  
SMSSV4-15, SMSSV6-5, SMSSV7-3  
03/05-06/14  
TestAmerica, Knoxville, TN  
Smokey Mountain Smelters, Knoxville, TN  
TO-15 (soil gas volatiles)

Sampling date(s):  
Organic Analyses:  
Data for Site:  
Analysis:

Dear Ms. Goddard:

The ESAT Work Team manually reviewed a Level 4 data package for ten soil gas (canister) grab samples analyzed for volatiles by *USEPA Compendium Method TO-15 Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)* (January 1999). Samples were collected by J.M. Waller Associates, Inc. (Atlanta, GA) utilizing the USEPA Region 4 SOP entitled *Soil Gas Sampling* (SESDPROC-307-R2, September 8, 2010). A Performance Evaluation Sample (PES) was not submitted to the laboratory for analysis with the project samples.

The samples were collected on 03/05/14 and 03/06/14 and were hand delivered to the laboratory on 03/06/14.

Data review was based primarily on the TO-15 method and the sampling SOP referenced above since neither the USEPA Region 4 organic data validation SOPs or the organic National Functional Guidelines (NFGs) were developed explicitly for this type of analysis. Particularly, calibration criteria provided by and developed for TO-15 (maximum 30% RSD for ICAL and  $\pm 30\%$  D for CCAL with no ending CCAL check required) were used instead of the more stringent USEPA Region 4 criteria, which are not applicable to the air matrix.

The laboratory submitted a complete Level 4 data package and no data qualifications, based on the laboratory's performance are required. Acceptable calibration performance including standard verifications, BFB tuning, internal standard area and retention time stability, surrogate recoveries (BFB) compliant method blank and laboratory control sample (LCS) recoveries were demonstrated. The laboratory reported a target analyte list that was a subset of the compounds present in the calibration standards and only reported positive results that exceeded their reporting limit (RL). Values for the method detection limits (MDL) were not provided on the



## Project 14-0103

reporting forms. Mass spectrum were provided for all positive results and VOC identifications that were reported.

The laboratory reported all results in both ppb v/v and  $\mu\text{g}/\text{m}^3$  units.

The laboratory provided the canisters used for sample analysis and provided cleaning certification data in the data package. One canister from each of the two batches were analyzed after each batch of canisters were cleaned.

Several potential sampling related issues were identified and responses to some questions were received via email (refer to the attached emails). The laboratory measured canister pressures ranging from 0.0 inches Hg to -13.8 inches Hg upon receipt (see attachment). It was stated in an email that "vacuum gauge measurements were not recorded during the field event." Gauge pressures, if taken, could have been used to verify that the canisters were in fact still evacuated prior to the sampling event and that the intended sample was collected with no subsequent leakage during transport back to the laboratory. The laboratory subsequently adjusted pressures for six of the canisters by increasing the lowest pressures upwards (see attachment) for an effective dilution. The laboratory used sample volumes of between 11 ml and 200 ml and all were brought up to 500 ml, which was the volume used for the calibration standards. Presumably the laboratory was able to achieve the desired project reporting limits using these dilutions and reduced sample volumes.

A subsequent email stated that "a reference sample was collected at sample location SMSSV8 at 15 feet." This reference (control) sample described in the Soil Gas Sampling SOP (Section 2.4 Quality Control) had positive results for m/p-xylene (2.9 ppb v/v), toluene (5.0 ppb v/v), and 1,2,4-trimethylbenzene (2.4 ppb v/v) which are very similar to many of the samples collected (see attached Client Sample Results).

Another email stated that "a duplicate sample was collected at location SMSSV02 (Client Sample IDs SMSSV2-10 and SMSSV92-10. The laboratory reported similar results for these two samples (see attached Client Sample Results). Section 2.4 of the Soil Gas Sampling SOP (Quality Control) specifies that field split samples are to be collected simultaneously by attaching the center leg of a "T" connector to the sample tubing with the remaining legs attached to two sample containers. Instead the field sampler collected two separate samples a couple of minutes apart.

Additionally, Section 2.1 of the Soil Gas Sampling SOP states that either Teflon or stainless steel tubing should be used. Polyethylene (PE) tubing was used instead. An email stated that "the tubing used for soil vapor sample collection was originally planned to be Teflon in accordance with the SESD SOP, however while attempting to thread the adaptor into the point holder at sample location SMSSV8, it was discovered that Teflon tubing did not have the rigidity to thread the adaptor into the point holder ..." it is quite possible that this modification may have biased the data (see discussion below).

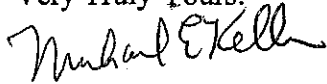


**Project 14-0103**

An equipment rinsate blank was submitted to a separate CLP laboratory for analysis and no positive results were reported. However, an email stated that "the rinsate blank did not include the PE tubing." Since this equipment rinsate blank did not represent the entire sample path any positive sample results reported by TestAmerica could be from either the actual samples collected and/or as a result of field contamination from PE tubing.

Please refer to the attached Data Quality Assessment Record. If you have any questions, please contact this office.

Very Truly Yours:

A handwritten signature in black ink, appearing to read "Michael E. Keller". The signature is fluid and cursive, with the first name "Michael" being more prominent.

Michael E. Keller  
Chemist (Data Validation Team Lead)  
Alion Science and Technology



## Data Quality Assessment Record (DQAR)

Review Date: 05/23/14      Analyses: VOA Soil Gas by TO15      Matrix: Air      Project #: 14-0103

SDG /Lab File: NA

Laboratory : TestAmerica, Knoxville, TN

Site Name: Smokey Mountain Smelters, Knoxville, TN

Check One:    EPA    ☐    ESAT    ☐    CLP    ☐    Other (specify)    Non-CLP (RAS)

## Sample Numbers:

SMSSV8-15				
SMSSV1-5				
SMSSV2-10				
SMSSV92-10				
SMSSV3-10				
SMSSV5-7				
SMSSV9-10				
SMSSV4-15				
SMSSV6-5				
SMSSV7-3				

## I. SUMMARY OF PROBLEMS AND COMMENTS:

A summary of deficiencies noted for the method used to generate data for this project is presented below. For the purposes of this review, the QC limits specified in the analytical method have been applied to the data. Data review was based primarily on the *USEPA Compendium Method TO-15 Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)* (January 1999) and the USEPA Region 4 SOP entitled *Soil Gas Sampling* (September 8, 2010) since neither the USEPA Region 4 organic data validation SOPs or the organic National Functional Guidelines (NFGs) were explicitly developed for this type of analysis. Particularly, calibration criteria provided by and developed for TO-15 (maximum 30% RSD for ICAL and  $\pm 30\%$  D for CCAL with no ending CCAL check required) were used instead of the tighter USEPA Region 4 criteria, which are not applicable to the air matrix.



**II. Data Quality Assessment** (An explanation for any "no" answer must be provided)  
 ? = see remarks

**1. Summary:**

	Yes	N/A	No
Were all requested analyses performed?	<u>X</u>	<u>      </u>	<u>      </u>
Were all required OC checks performed?	<u>X</u>	<u>      </u>	<u>      </u>
Were all required documents present?	<u>X</u>	<u>      </u>	<u>      </u>
Were requested detection limits met?	<u>      </u>	<u>?</u>	<u>      </u>

Remark: Requested reporting limits not known to reviewer and the laboratory did not include MDLs on their reporting forms.  
 Laboratory did use reduced sample volumes and dilutions for some samples.

**2. Holding Times:**

	Yes	N/A	No
VOA/BNA/PEST prepared within 14 days of sampling (7 days for VOA aromatics in non-preserved samples)?	<u>X</u>	<u>      </u>	<u>      </u>
PCDD/PCDF extracted within 30 days of sampling?	<u>      </u>	<u>X</u>	<u>      </u>
Extracts analyzed within 40 days of extraction?	<u>      </u>	<u>X</u>	<u>      </u>
Were all samples/extracts properly preserved?	<u>X</u>	<u>      </u>	<u>      </u>
For TCLP: Were RCRA TCLP holding times met?	<u>      </u>	<u>X</u>	<u>      </u>

Remark:

**3. GC/MS Tuning:**

	Yes	N/A	No
Were PFK/DFTPP/BFB criteria met?	<u>X</u>	<u>      </u>	<u>      </u>
<b>Pesticides:</b> Were standards run in proper sequence?	<u>      </u>	<u>X</u>	<u>      </u>
Combined DDT/Endrin Breakdown acceptable?	<u>      </u>	<u>X</u>	<u>      </u>
Retention time windows defined?	<u>      </u>	<u>X</u>	<u>      </u>

Remark:



## Project 14-0103

### 4.1 Initial Calibration:

	Yes	N/A	No
Were %RSDs acceptable?	<u>X</u>	<u>      </u>	<u>      </u>
Were RRFs acceptable?	<u>      </u>	<u>X</u>	<u>      </u>
Was S/N acceptable?	<u>      </u>	<u>X</u>	<u>      </u>
Were PCDD/PCDF ion ratios acceptable?	<u>      </u>	<u>X</u>	<u>      </u>

Remark: Initial calibration satisfied TO15 criteria.

### 4.2 Continuing Calibration:

	Yes	N/A	No
Were %RSDs acceptable?	<u>X</u>	<u>      </u>	<u>      </u>
Were RRFs acceptable?	<u>      </u>	<u>X</u>	<u>      </u>
Were PEST cont. calib. factors met?	<u>      </u>	<u>X</u>	<u>      </u>
Was PCDD/PCDF S/N acceptable?	<u>      </u>	<u>X</u>	<u>      </u>
Were PCDD/PCDF ion ratios acceptable?	<u>      </u>	<u>X</u>	<u>      </u>

Remark: Continuing calibration satisfied TO15 criteria.

### 5. Spikes:

	Yes	N/A	No
Was a method spike analysis performed?	<u>X</u>	<u>      </u>	<u>      </u>
Were matrix spike/ms. duplicate analyses performed?	<u>      </u>	<u>      </u>	<u>X</u>
Were acceptable recoveries obtained?	<u>X</u>	<u>      </u>	<u>      </u>
Was acceptable precision obtained?	<u>      </u>	<u>X</u>	<u>      </u>

Remark: Acceptable recoveries obtained for LCS. No measure of laboratory precision available. Acceptable precision was demonstrated for field duplicates.

### 6. Blanks:

	Yes	N/A	No
Were blank analyses performed?	<u>X</u>	<u>      </u>	<u>      </u>
Were any contaminants noted?	<u>      </u>	<u>      </u>	<u>X</u>
If yes, were blank rules applied to the data?	<u>      </u>	<u>X</u>	<u>      </u>

Remark:



**7. Performance Evaluation Sample:**

Was a P.E. Sample analyzed with the samples?

If yes, were acceptable results obtained?

Yes	N/A	No
<u>          </u>	<u>          </u>	<u>  X  </u>
<u>          </u>	<u>  X  </u>	<u>          </u>

Remark: No PES submitted.

**8. Internal Standard / PCDD/PCDF Recovery Standards:**

Were peak areas acceptable?

Yes	N/A	No
<u>  X  </u>	<u>          </u>	<u>          </u>

Remark:

**9. Surrogates / PCDD/PCDF Internal Standards:**

Were peak areas acceptable?

Yes	N/A	No
<u>  X  </u>	<u>          </u>	<u>          </u>

Remark:

**10. Compound Identification / Quantification:**

Were all positive results confirmed?

Was supporting documentation included?

Was a check of the calculations performed?

If yes, were results acceptable?

PCDD/PCDF ion ratios acceptable?

Yes	N/A	No
<u>  X  </u>	<u>          </u>	<u>          </u>
<u>  X  </u>	<u>          </u>	<u>          </u>
<u>  X  </u>	<u>  ?  </u>	<u>          </u>
<u>  X  </u>	<u>          </u>	<u>          </u>
<u>          </u>	<u>  X  </u>	<u>          </u>

Remark:

**11. Tentatively Identified Compounds?**

Were TICs requested for these analyses?

If yes, were results provided?

Yes	N/A	No
<u>          </u>	<u>  X  </u>	<u>          </u>
<u>          </u>	<u>  X  </u>	<u>          </u>

Remark: TICs were not reported.



### **III. Data Summary**

Based on a review of the data provided, the following is a table summarizing the data qualifiers used by Region 4 for this report.

Recommended Data Qualifiers					
Case	NA	Project Number:	14-0103	ELEMENT Sample ID. Nos	NA
Site	Smokey Mountain Smelters, Knoxville, TN			Date: 05/23/14	
Sample	Analyte(s)	Laboratory Report/ Qualifier		ESAT Suggested	
NA	NA	none		none	











# Summa Canister Dilution Worksheet

Client: J.M. Waller Associates, Inc.

Job No.: 140-1006-1

Lab Sample ID	Canister Volume (L)	Preadjusted Pressure ("Hg)	Preadjusted Pressure (atm)	Preadjusted Volume (L)	Adjusted Pressure (psig)	Adjusted Pressure (atm)	Adjusted Volume (L)	Initial Volume (mL)	Dilution Factor	Final Dilution Factor	Date	Analyst
140-1006-1	1	-6.2	0.79	0.79	+0.7	1.05	1.05		1.32	1.32	03/07/14 10:39	Taj, Holly M
140-1006-2	1	-8.5	0.72	0.72	+0.8	1.05	1.05		1.47	1.47	03/07/14 10:41	Taj, Holly M
140-1006-3	1	-13.8	0.54	0.54	+1.4	1.10	1.10		2.03	2.03	03/07/14 10:42	Taj, Holly M
140-1006-4	1	-13.4	0.55	0.55	+3.3	1.22	1.22		2.22	2.22	03/07/14 10:43	Taj, Holly M
140-1006-5	1	-3.2	0.89	0.89	32.7	3.22	3.22		3.61	3.61	03/07/14 14:14	Barlozhetskaya, Anna F
140-1006-5	1	0	1.00	1.00	32.7	3.22	3.22		3.22	11.62	03/07/14 14:16	Barlozhetskaya, Anna F
140-1006-8	1	-5.9	0.80	0.80	0.0	1.00	1.00		1.25	1.25	03/07/14 10:57	Taj, Holly M

## Formulae:

Preadjusted Volume (L) = ( Preadjusted Pressure ("Hg) + 29.92 "Hg \* Vol L ) / 29.92 "Hg

Adjusted Volume (L) = ( Adjusted Pressure (psig) + 14.7 psig \* Vol L ) / 14.7 psig

Dilution Factor = Adjusted Volume (L) / Preadjusted Volume (L)

## Where:

29.92 "Hg = Standard atmospheric pressure in inches of Mercury ("Hg)

14.7 psig = Standard atmospheric pressure in pounds per square inch gauge (psig)

*Attest*







# TAL Knoxville

5815 Middlebrook Pike

Knoxville, TN 37921

phone 865-291-3000 fax 865-584-4315

## Canister Samples Chain of Custody Record

TestAmerica assumes no liability with respect to the collection and shipment of these samples.

# TestAmerica


THE LEADER IN ENVIRONMENTAL TESTING

Client Contact Information		Project Manager: <u>JANICE JUSTIN</u>		Sampled By: <u>ANDREW GRIMMEK</u>		1 of 2 COCs	
Company: <u>J.M. WALLER ASSOC. INC</u>		Phone: <u>404-443-2777</u>					
Address: <u>108 HARTSFIELD CENTER PKWY</u>		Site Contact:					
City/State/Zip: <u>ATLANTA, GA 30354</u>		TAL Contact:					
Phone: <u>404-443-2777</u>							
FAX: <u>404-443-2770</u>							
Project Name: <u>SMOKEY MOUNTAIN SMelter</u>		Analysis Turnaround Time					
Site/location: <u>1508 MARYVILLE PIKE KNOXVILLE</u>		Standard (Specify)					
PO #		Rush (Specify)					

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, "Hg (Start)	Canister Vacuum in Field, "Hg (Stop)	Flow Controller ID	Canister ID	TO-15	TO-14A	EPA 3C	EPA 25C	ASTM D-1946	Other (Please specify in notes section)	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)
SMSSV8-15 (return sample)	3/5/14	1505	1505			NA	09887	X										
SMSSV1-5	3/5/14	1550	1550			NA	10517	X										
SMSSV2-10	3/5/14	1611	1611			NA	9750	X										
SMSSV2-10	3/5/14	1613	1613			NA	9591	X										
SMSSV3-10	3/5/14	1733	1733			NA	10741	X										
SMSSV5-7	3/5/14	1707	1707			NA	10961	X										

Sampled by: <u>ANDREW GRIMMEK</u>	Temperature (Fahrenheit)		HAND DELIVERED NO CUSTODY SEALS RECEIVED AT AMBIENT TEMP OKD 3-6-14 12 CANS / 0 FLAWS
	Interior	Ambient	
	Start		
	Stop		
	Pressure (inches of Hg)		
	Interior	Ambient	
	Start		
	Stop		

Special Instructions/QC Requirements & Comments:

  
 140-1006 Chain of Custody

Canisters Shipped by:	Date/Time:	Canisters Received by:
<u>[Signature]</u>	<u>3/6/14 1345</u>	<u>[Signature]</u>
Samples Relinquished by:	Date/Time:	Received by:
<u>[Signature]</u>	<u>3-6-14 13:45</u>	<u>[Signature]</u>
Relinquished by:	Date/Time:	Received by:

Att to Andrew







# TAL Knoxville

5815 Middlebrook Pike

Knoxville, TN 37921

phone 865-291-3000 fax 865-584-4315

## Canister Samples Chain of Custody Record

TestAmerica assumes no liability with respect to the collection and shipment of these samples.

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Client Contact Information		Project Manager: <u>JANICE AUSTIN</u>		Sampled By: <u>ANDREW GEMAKE</u>		2 of 2 COCs	
Company: <u>JAWALEK ASSOC. INC.</u>		Phone: <u>404-443-2777</u>					
Address: <u>108 HARTSFIELD CENTER PKWY #610</u>		Site Contact:					
City/State/Zip: <u>ATLANTA, GA 30354</u>		TAL Contact:					
Phone: <u>404-443-2777</u>							
FAX: <u>404-443-2770</u>							
Project Name: <u>SMOKEY MOUNTAIN SMOOTHER</u>		Analysis Turnaround Time					
Site/location: <u>1508 MARTIN LUTHER KING JR. BLVD</u>		Standard (Specify)					
PO #		Rush (Specify)					

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, "Hg (Start)	Canister Vacuum in Field, "Hg (Stop)	Flow Controller ID	Canister ID	TO-15	TO-14A	EPA 3C	EPA 26C	ASTM D-1946	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)
SMSSV9-10	3/6/14	0950	0950			NA	10499	X									X		
SMSSV4-15	3/6/14	1025	1025			NA	10921	K									X		
SMSSV6-5	3/6/14	1050	1050			NA	10336	K									X		
SMSSV7-3	3/6/14	1125	1125			NA	09641	X									X		

Sampled by: <u>ANDREW GEMAKE</u>	Temperature (Fahrenheit)	
	Interior	Ambient
	Start	
	Stop	
	Pressure (inches of Hg)	
	Interior	Ambient
	Start	
	Stop	

Special Instructions/QC Requirements & Comments:

Canisters Shipped by: <u>[Signature]</u>	Date/Time: <u>3/6/14 1345</u>	Canisters Received by: <u>[Signature]</u>
Samples Relinquished by: <u>[Signature]</u>	Date/Time: <u>3/6/14 1345</u>	Received by: <u>[Signature]</u>
Relinquished by: <u>[Signature]</u>	Date/Time: <u>3/6/14</u>	Received by: <u>[Signature]</u>







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV8-15

Lab Sample ID: 140-1006-1

Date Collected: 03/05/14 15:05

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0		ppb v/v			03/12/14 21:43	1.32
Benzyl chloride	ND		4.0		ppb v/v			03/12/14 21:43	1.32
Bromomethane	ND		2.0		ppb v/v			03/12/14 21:43	1.32
Carbon tetrachloride	ND		2.0		ppb v/v			03/12/14 21:43	1.32
Chlorobenzene	ND		2.0		ppb v/v			03/12/14 21:43	1.32
Chloroethane	ND		2.0		ppb v/v			03/12/14 21:43	1.32
Chloroform	ND		2.0		ppb v/v			03/12/14 21:43	1.32
Chloromethane	ND		5.0		ppb v/v			03/12/14 21:43	1.32
cis-1,2-Dichloroethene	ND		2.0		ppb v/v			03/12/14 21:43	1.32
cis-1,3-Dichloropropene	ND		2.0		ppb v/v			03/12/14 21:43	1.32
1,2-Dibromoethane (EDB)	ND		2.0		ppb v/v			03/12/14 21:43	1.32
1,2-Dichlorobenzene	ND		2.0		ppb v/v			03/12/14 21:43	1.32
1,3-Dichlorobenzene	ND		2.0		ppb v/v			03/12/14 21:43	1.32
1,4-Dichlorobenzene	ND		2.0		ppb v/v			03/12/14 21:43	1.32
Dichlorodifluoromethane	ND		2.0		ppb v/v			03/12/14 21:43	1.32
1,1-Dichloroethane	ND		2.0		ppb v/v			03/12/14 21:43	1.32
1,2-Dichloroethane	ND		2.0		ppb v/v			03/12/14 21:43	1.32
1,1-Dichloroethene	ND		2.0		ppb v/v			03/12/14 21:43	1.32
1,2-Dichloropropane	ND		2.0		ppb v/v			03/12/14 21:43	1.32
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0		ppb v/v			03/12/14 21:43	1.32
Ethylbenzene	ND		2.0		ppb v/v			03/12/14 21:43	1.32
Hexachlorobutadiene	ND		10		ppb v/v			03/12/14 21:43	1.32
Methylene Chloride	ND		5.0		ppb v/v			03/12/14 21:43	1.32
m-Xylene & p-Xylene	2.9		2.0		ppb v/v			03/12/14 21:43	1.32
o-Xylene	ND		2.0		ppb v/v			03/12/14 21:43	1.32
Styrene	ND		2.0		ppb v/v			03/12/14 21:43	1.32
1,1,2,2-Tetrachloroethane	ND		2.0		ppb v/v			03/12/14 21:43	1.32
Tetrachloroethene	ND		2.0		ppb v/v			03/12/14 21:43	1.32
Toluene	5.0		2.0		ppb v/v			03/12/14 21:43	1.32
trans-1,3-Dichloropropene	ND		2.0		ppb v/v			03/12/14 21:43	1.32
1,2,4-Trichlorobenzene	ND		10		ppb v/v			03/12/14 21:43	1.32
1,1,1-Trichloroethane	ND		2.0		ppb v/v			03/12/14 21:43	1.32
1,1,2-Trichloroethane	ND		2.0		ppb v/v			03/12/14 21:43	1.32
Trichloroethene	ND		2.0		ppb v/v			03/12/14 21:43	1.32
Trichlorofluoromethane	ND		2.0		ppb v/v			03/12/14 21:43	1.32
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0		ppb v/v			03/12/14 21:43	1.32
1,2,4-Trimethylbenzene	2.4		2.0		ppb v/v			03/12/14 21:43	1.32
1,3,5-Trimethylbenzene	ND		2.0		ppb v/v			03/12/14 21:43	1.32
Vinyl chloride	ND		2.0		ppb v/v			03/12/14 21:43	1.32

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		6.4		ug/m3			03/12/14 21:43	1.32
Benzyl chloride	ND		21		ug/m3			03/12/14 21:43	1.32
Bromomethane	ND		7.8		ug/m3			03/12/14 21:43	1.32
Carbon tetrachloride	ND		13		ug/m3			03/12/14 21:43	1.32
Chlorobenzene	ND		9.2		ug/m3			03/12/14 21:43	1.32
Chloroethane	ND		5.3		ug/m3			03/12/14 21:43	1.32
Chloroform	ND		9.8		ug/m3			03/12/14 21:43	1.32
Chloromethane	ND		10		ug/m3			03/12/14 21:43	1.32

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV8-15

Lab Sample ID: 140-1006-1

Date Collected: 03/05/14 15:05

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		7.9		ug/m3			03/12/14 21:43	1.32
cis-1,3-Dichloropropene	ND		9.1		ug/m3			03/12/14 21:43	1.32
1,2-Dibromoethane (EDB)	ND		15		ug/m3			03/12/14 21:43	1.32
1,2-Dichlorobenzene	ND		12		ug/m3			03/12/14 21:43	1.32
1,3-Dichlorobenzene	ND		12		ug/m3			03/12/14 21:43	1.32
1,4-Dichlorobenzene	ND		12		ug/m3			03/12/14 21:43	1.32
Dichlorodifluoromethane	ND		9.9		ug/m3			03/12/14 21:43	1.32
1,1-Dichloroethane	ND		8.1		ug/m3			03/12/14 21:43	1.32
1,2-Dichloroethane	ND		8.1		ug/m3			03/12/14 21:43	1.32
1,1-Dichloroethene	ND		7.9		ug/m3			03/12/14 21:43	1.32
1,2-Dichloropropane	ND		9.2		ug/m3			03/12/14 21:43	1.32
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14		ug/m3			03/12/14 21:43	1.32
Ethylbenzene	ND		8.7		ug/m3			03/12/14 21:43	1.32
Hexachlorobutadiene	ND		110		ug/m3			03/12/14 21:43	1.32
Methylene Chloride	ND		17		ug/m3			03/12/14 21:43	1.32
m-Xylene & p-Xylene	13		8.7		ug/m3			03/12/14 21:43	1.32
o-Xylene	ND		8.7		ug/m3			03/12/14 21:43	1.32
Styrene	ND		8.5		ug/m3			03/12/14 21:43	1.32
1,1,2,2-Tetrachloroethane	ND		14		ug/m3			03/12/14 21:43	1.32
Tetrachloroethene	ND		14		ug/m3			03/12/14 21:43	1.32
Toluene	19		7.5		ug/m3			03/12/14 21:43	1.32
trans-1,3-Dichloropropene	ND		9.1		ug/m3			03/12/14 21:43	1.32
1,2,4-Trichlorobenzene	ND		74		ug/m3			03/12/14 21:43	1.32
1,1,1-Trichloroethane	ND		11		ug/m3			03/12/14 21:43	1.32
1,1,2-Trichloroethane	ND		11		ug/m3			03/12/14 21:43	1.32
Trichloroethene	ND		11		ug/m3			03/12/14 21:43	1.32
Trichlorofluoromethane	ND		11		ug/m3			03/12/14 21:43	1.32
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15		ug/m3			03/12/14 21:43	1.32
1,2,4-Trimethylbenzene	12		9.8		ug/m3			03/12/14 21:43	1.32
1,3,5-Trimethylbenzene	ND		9.8		ug/m3			03/12/14 21:43	1.32
Vinyl chloride	ND		5.1		ug/m3			03/12/14 21:43	1.32

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		60 - 140		03/12/14 21:43	1.32

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV1-5

Lab Sample ID: 140-1006-2

Date Collected: 03/05/14 15:50

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0		ppb v/v			03/12/14 22:37	1.47
Benzyl chloride	ND		4.0		ppb v/v			03/12/14 22:37	1.47
Bromomethane	ND		2.0		ppb v/v			03/12/14 22:37	1.47
Carbon tetrachloride	ND		2.0		ppb v/v			03/12/14 22:37	1.47
Chlorobenzene	ND		2.0		ppb v/v			03/12/14 22:37	1.47
Chloroethane	ND		2.0		ppb v/v			03/12/14 22:37	1.47
Chloroform	ND		2.0		ppb v/v			03/12/14 22:37	1.47
Chloromethane	ND		5.0		ppb v/v			03/12/14 22:37	1.47
cis-1,2-Dichloroethene	ND		2.0		ppb v/v			03/12/14 22:37	1.47
cis-1,3-Dichloropropene	ND		2.0		ppb v/v			03/12/14 22:37	1.47
1,2-Dibromoethane (EDB)	ND		2.0		ppb v/v			03/12/14 22:37	1.47
1,2-Dichlorobenzene	ND		2.0		ppb v/v			03/12/14 22:37	1.47
1,3-Dichlorobenzene	ND		2.0		ppb v/v			03/12/14 22:37	1.47
1,4-Dichlorobenzene	ND		2.0		ppb v/v			03/12/14 22:37	1.47
Dichlorodifluoromethane	ND		2.0		ppb v/v			03/12/14 22:37	1.47
1,1-Dichloroethane	ND		2.0		ppb v/v			03/12/14 22:37	1.47
1,2-Dichloroethane	ND		2.0		ppb v/v			03/12/14 22:37	1.47
1,1-Dichloroethene	ND		2.0		ppb v/v			03/12/14 22:37	1.47
1,2-Dichloropropane	ND		2.0		ppb v/v			03/12/14 22:37	1.47
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0		ppb v/v			03/12/14 22:37	1.47
Ethylbenzene	ND		2.0		ppb v/v			03/12/14 22:37	1.47
Hexachlorobutadiene	ND		10		ppb v/v			03/12/14 22:37	1.47
Methylene Chloride	ND		5.0		ppb v/v			03/12/14 22:37	1.47
m-Xylene & p-Xylene	3.2		2.0		ppb v/v			03/12/14 22:37	1.47
o-Xylene	ND		2.0		ppb v/v			03/12/14 22:37	1.47
Styrene	ND		2.0		ppb v/v			03/12/14 22:37	1.47
1,1,2,2-Tetrachloroethane	ND		2.0		ppb v/v			03/12/14 22:37	1.47
Tetrachloroethene	ND		2.0		ppb v/v			03/12/14 22:37	1.47
Toluene	3.5		2.0		ppb v/v			03/12/14 22:37	1.47
trans-1,3-Dichloropropene	ND		2.0		ppb v/v			03/12/14 22:37	1.47
1,2,4-Trichlorobenzene	ND		10		ppb v/v			03/12/14 22:37	1.47
1,1,1-Trichloroethane	ND		2.0		ppb v/v			03/12/14 22:37	1.47
1,1,2-Trichloroethane	ND		2.0		ppb v/v			03/12/14 22:37	1.47
Trichloroethene	ND		2.0		ppb v/v			03/12/14 22:37	1.47
Trichlorofluoromethane	ND		2.0		ppb v/v			03/12/14 22:37	1.47
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0		ppb v/v			03/12/14 22:37	1.47
1,2,4-Trimethylbenzene	3.8		2.0		ppb v/v			03/12/14 22:37	1.47
1,3,5-Trimethylbenzene	ND		2.0		ppb v/v			03/12/14 22:37	1.47
Vinyl chloride	ND		2.0		ppb v/v			03/12/14 22:37	1.47

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		6.4		ug/m3			03/12/14 22:37	1.47
Benzyl chloride	ND		21		ug/m3			03/12/14 22:37	1.47
Bromomethane	ND		7.8		ug/m3			03/12/14 22:37	1.47
Carbon tetrachloride	ND		13		ug/m3			03/12/14 22:37	1.47
Chlorobenzene	ND		9.2		ug/m3			03/12/14 22:37	1.47
Chloroethane	ND		5.3		ug/m3			03/12/14 22:37	1.47
Chloroform	ND		9.8		ug/m3			03/12/14 22:37	1.47
Chloromethane	ND		10		ug/m3			03/12/14 22:37	1.47

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV1-5

Lab Sample ID: 140-1006-2

Date Collected: 03/05/14 15:50

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		7.9		ug/m3			03/12/14 22:37	1.47
cis-1,3-Dichloropropene	ND		9.1		ug/m3			03/12/14 22:37	1.47
1,2-Dibromoethane (EDB)	ND		15		ug/m3			03/12/14 22:37	1.47
1,2-Dichlorobenzene	ND		12		ug/m3			03/12/14 22:37	1.47
1,3-Dichlorobenzene	ND		12		ug/m3			03/12/14 22:37	1.47
1,4-Dichlorobenzene	ND		12		ug/m3			03/12/14 22:37	1.47
Dichlorodifluoromethane	ND		9.9		ug/m3			03/12/14 22:37	1.47
1,1-Dichloroethane	ND		8.1		ug/m3			03/12/14 22:37	1.47
1,2-Dichloroethane	ND		8.1		ug/m3			03/12/14 22:37	1.47
1,1-Dichloroethene	ND		7.9		ug/m3			03/12/14 22:37	1.47
1,2-Dichloropropane	ND		9.2		ug/m3			03/12/14 22:37	1.47
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14		ug/m3			03/12/14 22:37	1.47
Ethylbenzene	ND		8.7		ug/m3			03/12/14 22:37	1.47
Hexachlorobutadiene	ND		110		ug/m3			03/12/14 22:37	1.47
Methylene Chloride	ND		17		ug/m3			03/12/14 22:37	1.47
m-Xylene & p-Xylene	14		8.7		ug/m3			03/12/14 22:37	1.47
o-Xylene	ND		8.7		ug/m3			03/12/14 22:37	1.47
Styrene	ND		8.5		ug/m3			03/12/14 22:37	1.47
1,1,2,2-Tetrachloroethane	ND		14		ug/m3			03/12/14 22:37	1.47
Tetrachloroethene	ND		14		ug/m3			03/12/14 22:37	1.47
Toluene	13		7.5		ug/m3			03/12/14 22:37	1.47
trans-1,3-Dichloropropene	ND		9.1		ug/m3			03/12/14 22:37	1.47
1,2,4-Trichlorobenzene	ND		74		ug/m3			03/12/14 22:37	1.47
1,1,1-Trichloroethane	ND		11		ug/m3			03/12/14 22:37	1.47
1,1,2-Trichloroethane	ND		11		ug/m3			03/12/14 22:37	1.47
Trichloroethene	ND		11		ug/m3			03/12/14 22:37	1.47
Trichlorofluoromethane	ND		11		ug/m3			03/12/14 22:37	1.47
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15		ug/m3			03/12/14 22:37	1.47
1,2,4-Trimethylbenzene	19		9.8		ug/m3			03/12/14 22:37	1.47
1,3,5-Trimethylbenzene	ND		9.8		ug/m3			03/12/14 22:37	1.47
Vinyl chloride	ND		5.1		ug/m3			03/12/14 22:37	1.47
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		60 - 140					03/12/14 22:37	1.47

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV2-10

Lab Sample ID: 140-1006-3

Date Collected: 03/05/14 16:11

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0		ppb v/v			03/12/14 23:31	2.03
Benzyl chloride	ND		4.0		ppb v/v			03/12/14 23:31	2.03
Bromomethane	ND		2.0		ppb v/v			03/12/14 23:31	2.03
Carbon tetrachloride	ND		2.0		ppb v/v			03/12/14 23:31	2.03
Chlorobenzene	ND		2.0		ppb v/v			03/12/14 23:31	2.03
Chloroethane	ND		2.0		ppb v/v			03/12/14 23:31	2.03
Chloroform	ND		2.0		ppb v/v			03/12/14 23:31	2.03
Chloromethane	ND		5.0		ppb v/v			03/12/14 23:31	2.03
cis-1,2-Dichloroethene	ND		2.0		ppb v/v			03/12/14 23:31	2.03
cis-1,3-Dichloropropene	ND		2.0		ppb v/v			03/12/14 23:31	2.03
1,2-Dibromoethane (EDB)	ND		2.0		ppb v/v			03/12/14 23:31	2.03
1,2-Dichlorobenzene	ND		2.0		ppb v/v			03/12/14 23:31	2.03
1,3-Dichlorobenzene	ND		2.0		ppb v/v			03/12/14 23:31	2.03
1,4-Dichlorobenzene	ND		2.0		ppb v/v			03/12/14 23:31	2.03
Dichlorodifluoromethane	ND		2.0		ppb v/v			03/12/14 23:31	2.03
1,1-Dichloroethane	ND		2.0		ppb v/v			03/12/14 23:31	2.03
1,2-Dichloroethane	ND		2.0		ppb v/v			03/12/14 23:31	2.03
1,1-Dichloroethene	ND		2.0		ppb v/v			03/12/14 23:31	2.03
1,2-Dichloropropane	ND		2.0		ppb v/v			03/12/14 23:31	2.03
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0		ppb v/v			03/12/14 23:31	2.03
Ethylbenzene	ND		2.0		ppb v/v			03/12/14 23:31	2.03
Hexachlorobutadiene	ND		10		ppb v/v			03/12/14 23:31	2.03
Methylene Chloride	ND		5.0		ppb v/v			03/12/14 23:31	2.03
m-Xylene & p-Xylene	3.1		2.0		ppb v/v			03/12/14 23:31	2.03
o-Xylene	ND		2.0		ppb v/v			03/12/14 23:31	2.03
Styrene	ND		2.0		ppb v/v			03/12/14 23:31	2.03
1,1,2,2-Tetrachloroethane	ND		2.0		ppb v/v			03/12/14 23:31	2.03
Tetrachloroethene	ND		2.0		ppb v/v			03/12/14 23:31	2.03
Toluene	3.7		2.0		ppb v/v			03/12/14 23:31	2.03
trans-1,3-Dichloropropene	ND		2.0		ppb v/v			03/12/14 23:31	2.03
1,2,4-Trichlorobenzene	ND		10		ppb v/v			03/12/14 23:31	2.03
1,1,1-Trichloroethane	ND		2.0		ppb v/v			03/12/14 23:31	2.03
1,1,2-Trichloroethane	ND		2.0		ppb v/v			03/12/14 23:31	2.03
Trichloroethene	ND		2.0		ppb v/v			03/12/14 23:31	2.03
Trichlorofluoromethane	ND		2.0		ppb v/v			03/12/14 23:31	2.03
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0		ppb v/v			03/12/14 23:31	2.03
1,2,4-Trimethylbenzene	3.0		2.0		ppb v/v			03/12/14 23:31	2.03
1,3,5-Trimethylbenzene	ND		2.0		ppb v/v			03/12/14 23:31	2.03
Vinyl chloride	ND		2.0		ppb v/v			03/12/14 23:31	2.03

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		6.4		ug/m3			03/12/14 23:31	2.03
Benzyl chloride	ND		21		ug/m3			03/12/14 23:31	2.03
Bromomethane	ND		7.8		ug/m3			03/12/14 23:31	2.03
Carbon tetrachloride	ND		13		ug/m3			03/12/14 23:31	2.03
Chlorobenzene	ND		9.2		ug/m3			03/12/14 23:31	2.03
Chloroethane	ND		5.3		ug/m3			03/12/14 23:31	2.03
Chloroform	ND		9.8		ug/m3			03/12/14 23:31	2.03
Chloromethane	ND		10		ug/m3			03/12/14 23:31	2.03

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV2-10

Lab Sample ID: 140-1006-3

Date Collected: 03/05/14 16:11

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		7.9		ug/m3			03/12/14 23:31	2.03
cis-1,3-Dichloropropene	ND		9.1		ug/m3			03/12/14 23:31	2.03
1,2-Dibromoethane (EDB)	ND		15		ug/m3			03/12/14 23:31	2.03
1,2-Dichlorobenzene	ND		12		ug/m3			03/12/14 23:31	2.03
1,3-Dichlorobenzene	ND		12		ug/m3			03/12/14 23:31	2.03
1,4-Dichlorobenzene	ND		12		ug/m3			03/12/14 23:31	2.03
Dichlorodifluoromethane	ND		9.9		ug/m3			03/12/14 23:31	2.03
1,1-Dichloroethane	ND		8.1		ug/m3			03/12/14 23:31	2.03
1,2-Dichloroethane	ND		8.1		ug/m3			03/12/14 23:31	2.03
1,1-Dichloroethene	ND		7.9		ug/m3			03/12/14 23:31	2.03
1,2-Dichloropropane	ND		9.2		ug/m3			03/12/14 23:31	2.03
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14		ug/m3			03/12/14 23:31	2.03
Ethylbenzene	ND		8.7		ug/m3			03/12/14 23:31	2.03
Hexachlorobutadiene	ND		110		ug/m3			03/12/14 23:31	2.03
Methylene Chloride	ND		17		ug/m3			03/12/14 23:31	2.03
m-Xylene & p-Xylene	13		8.7		ug/m3			03/12/14 23:31	2.03
o-Xylene	ND		8.7		ug/m3			03/12/14 23:31	2.03
Styrene	ND		8.5		ug/m3			03/12/14 23:31	2.03
1,1,2,2-Tetrachloroethane	ND		14		ug/m3			03/12/14 23:31	2.03
Tetrachloroethene	ND		14		ug/m3			03/12/14 23:31	2.03
Toluene	14		7.5		ug/m3			03/12/14 23:31	2.03
trans-1,3-Dichloropropene	ND		9.1		ug/m3			03/12/14 23:31	2.03
1,2,4-Trichlorobenzene	ND		74		ug/m3			03/12/14 23:31	2.03
1,1,1-Trichloroethane	ND		11		ug/m3			03/12/14 23:31	2.03
1,1,2-Trichloroethane	ND		11		ug/m3			03/12/14 23:31	2.03
Trichloroethene	ND		11		ug/m3			03/12/14 23:31	2.03
Trichlorofluoromethane	ND		11		ug/m3			03/12/14 23:31	2.03
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15		ug/m3			03/12/14 23:31	2.03
1,2,4-Trimethylbenzene	15		9.8		ug/m3			03/12/14 23:31	2.03
1,3,5-Trimethylbenzene	ND		9.8		ug/m3			03/12/14 23:31	2.03
Vinyl chloride	ND		5.1		ug/m3			03/12/14 23:31	2.03

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		60 - 140		03/12/14 23:31	2.03

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV92-10

Lab Sample ID: 140-1006-4

Date Collected: 03/05/14 16:13

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0		ppb v/v			03/13/14 00:25	2.22
Benzyl chloride	ND		4.0		ppb v/v			03/13/14 00:25	2.22
Bromomethane	ND		2.0		ppb v/v			03/13/14 00:25	2.22
Carbon tetrachloride	ND		2.0		ppb v/v			03/13/14 00:25	2.22
Chlorobenzene	ND		2.0		ppb v/v			03/13/14 00:25	2.22
Chloroethane	ND		2.0		ppb v/v			03/13/14 00:25	2.22
Chloroform	ND		2.0		ppb v/v			03/13/14 00:25	2.22
Chloromethane	ND		5.0		ppb v/v			03/13/14 00:25	2.22
cis-1,2-Dichloroethene	ND		2.0		ppb v/v			03/13/14 00:25	2.22
cis-1,3-Dichloropropene	ND		2.0		ppb v/v			03/13/14 00:25	2.22
1,2-Dibromoethane (EDB)	ND		2.0		ppb v/v			03/13/14 00:25	2.22
1,2-Dichlorobenzene	ND		2.0		ppb v/v			03/13/14 00:25	2.22
1,3-Dichlorobenzene	ND		2.0		ppb v/v			03/13/14 00:25	2.22
1,4-Dichlorobenzene	ND		2.0		ppb v/v			03/13/14 00:25	2.22
Dichlorodifluoromethane	ND		2.0		ppb v/v			03/13/14 00:25	2.22
1,1-Dichloroethane	ND		2.0		ppb v/v			03/13/14 00:25	2.22
1,2-Dichloroethane	ND		2.0		ppb v/v			03/13/14 00:25	2.22
1,1-Dichloroethene	ND		2.0		ppb v/v			03/13/14 00:25	2.22
1,2-Dichloropropane	ND		2.0		ppb v/v			03/13/14 00:25	2.22
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0		ppb v/v			03/13/14 00:25	2.22
Ethylbenzene	ND		2.0		ppb v/v			03/13/14 00:25	2.22
Hexachlorobutadiene	ND		10		ppb v/v			03/13/14 00:25	2.22
Methylene Chloride	ND		5.0		ppb v/v			03/13/14 00:25	2.22
m-Xylene & p-Xylene	2.8		2.0		ppb v/v			03/13/14 00:25	2.22
o-Xylene	ND		2.0		ppb v/v			03/13/14 00:25	2.22
Styrene	ND		2.0		ppb v/v			03/13/14 00:25	2.22
1,1,2,2-Tetrachloroethane	ND		2.0		ppb v/v			03/13/14 00:25	2.22
Tetrachloroethene	ND		2.0		ppb v/v			03/13/14 00:25	2.22
Toluene	3.3		2.0		ppb v/v			03/13/14 00:25	2.22
trans-1,3-Dichloropropene	ND		2.0		ppb v/v			03/13/14 00:25	2.22
1,2,4-Trichlorobenzene	ND		10		ppb v/v			03/13/14 00:25	2.22
1,1,1-Trichloroethane	ND		2.0		ppb v/v			03/13/14 00:25	2.22
1,1,2-Trichloroethane	ND		2.0		ppb v/v			03/13/14 00:25	2.22
Trichloroethene	ND		2.0		ppb v/v			03/13/14 00:25	2.22
Trichlorofluoromethane	ND		2.0		ppb v/v			03/13/14 00:25	2.22
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0		ppb v/v			03/13/14 00:25	2.22
1,2,4-Trimethylbenzene	2.7		2.0		ppb v/v			03/13/14 00:25	2.22
1,3,5-Trimethylbenzene	ND		2.0		ppb v/v			03/13/14 00:25	2.22
Vinyl chloride	ND		2.0		ppb v/v			03/13/14 00:25	2.22

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		6.4		ug/m3			03/13/14 00:25	2.22
Benzyl chloride	ND		21		ug/m3			03/13/14 00:25	2.22
Bromomethane	ND		7.8		ug/m3			03/13/14 00:25	2.22
Carbon tetrachloride	ND		13		ug/m3			03/13/14 00:25	2.22
Chlorobenzene	ND		9.2		ug/m3			03/13/14 00:25	2.22
Chloroethane	ND		5.3		ug/m3			03/13/14 00:25	2.22
Chloroform	ND		9.8		ug/m3			03/13/14 00:25	2.22
Chloromethane	ND		10		ug/m3			03/13/14 00:25	2.22

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV92-10

Lab Sample ID: 140-1006-4

Date Collected: 03/05/14 16:13

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		7.9		ug/m3			03/13/14 00:25	2.22
cis-1,3-Dichloropropene	ND		9.1		ug/m3			03/13/14 00:25	2.22
1,2-Dibromoethane (EDB)	ND		15		ug/m3			03/13/14 00:25	2.22
1,2-Dichlorobenzene	ND		12		ug/m3			03/13/14 00:25	2.22
1,3-Dichlorobenzene	ND		12		ug/m3			03/13/14 00:25	2.22
1,4-Dichlorobenzene	ND		12		ug/m3			03/13/14 00:25	2.22
Dichlorodifluoromethane	ND		9.9		ug/m3			03/13/14 00:25	2.22
1,1-Dichloroethane	ND		8.1		ug/m3			03/13/14 00:25	2.22
1,2-Dichloroethane	ND		8.1		ug/m3			03/13/14 00:25	2.22
1,1-Dichloroethene	ND		7.9		ug/m3			03/13/14 00:25	2.22
1,2-Dichloropropane	ND		9.2		ug/m3			03/13/14 00:25	2.22
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14		ug/m3			03/13/14 00:25	2.22
Ethylbenzene	ND		8.7		ug/m3			03/13/14 00:25	2.22
Hexachlorobutadiene	ND		110		ug/m3			03/13/14 00:25	2.22
Methylene Chloride	ND		17		ug/m3			03/13/14 00:25	2.22
m-Xylene & p-Xylene	12		8.7		ug/m3			03/13/14 00:25	2.22
o-Xylene	ND		8.7		ug/m3			03/13/14 00:25	2.22
Styrene	ND		8.5		ug/m3			03/13/14 00:25	2.22
1,1,2,2-Tetrachloroethane	ND		14		ug/m3			03/13/14 00:25	2.22
Tetrachloroethene	ND		14		ug/m3			03/13/14 00:25	2.22
Toluene	12		7.5		ug/m3			03/13/14 00:25	2.22
trans-1,3-Dichloropropene	ND		9.1		ug/m3			03/13/14 00:25	2.22
1,2,4-Trichlorobenzene	ND		74		ug/m3			03/13/14 00:25	2.22
1,1,1-Trichloroethane	ND		11		ug/m3			03/13/14 00:25	2.22
1,1,2-Trichloroethane	ND		11		ug/m3			03/13/14 00:25	2.22
Trichloroethene	ND		11		ug/m3			03/13/14 00:25	2.22
Trichlorofluoromethane	ND		11		ug/m3			03/13/14 00:25	2.22
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15		ug/m3			03/13/14 00:25	2.22
1,2,4-Trimethylbenzene	13		9.8		ug/m3			03/13/14 00:25	2.22
1,3,5-Trimethylbenzene	ND		9.8		ug/m3			03/13/14 00:25	2.22
Vinyl chloride	ND		5.1		ug/m3			03/13/14 00:25	2.22

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		60 - 140		03/13/14 00:25	2.22

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV3-10

Lab Sample ID: 140-1006-5

Date Collected: 03/05/14 17:33

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	13		2.3		ppb v/v			03/13/14 08:29	11.62
Benzyl chloride	ND		4.6		ppb v/v			03/13/14 08:29	11.62
Bromomethane	ND		2.3		ppb v/v			03/13/14 08:29	11.62
Carbon tetrachloride	ND		2.3		ppb v/v			03/13/14 08:29	11.62
Chlorobenzene	2.9		2.3		ppb v/v			03/13/14 08:29	11.62
Chloroethane	ND		2.3		ppb v/v			03/13/14 08:29	11.62
Chloroform	ND		2.3		ppb v/v			03/13/14 08:29	11.62
Chloromethane	9.8		5.8		ppb v/v			03/13/14 08:29	11.62
cis-1,2-Dichloroethene	ND		2.3		ppb v/v			03/13/14 08:29	11.62
cis-1,3-Dichloropropene	ND		2.3		ppb v/v			03/13/14 08:29	11.62
1,2-Dibromoethane (EDB)	ND		2.3		ppb v/v			03/13/14 08:29	11.62
1,2-Dichlorobenzene	ND		2.3		ppb v/v			03/13/14 08:29	11.62
1,3-Dichlorobenzene	ND		2.3		ppb v/v			03/13/14 08:29	11.62
1,4-Dichlorobenzene	ND		2.3		ppb v/v			03/13/14 08:29	11.62
Dichlorodifluoromethane	ND		2.3		ppb v/v			03/13/14 08:29	11.62
1,1-Dichloroethane	4.4		2.3		ppb v/v			03/13/14 08:29	11.62
1,2-Dichloroethane	5.4		2.3		ppb v/v			03/13/14 08:29	11.62
1,1-Dichloroethene	ND		2.3		ppb v/v			03/13/14 08:29	11.62
1,2-Dichloropropane	ND		2.3		ppb v/v			03/13/14 08:29	11.62
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.3		ppb v/v			03/13/14 08:29	11.62
Ethylbenzene	12		2.3		ppb v/v			03/13/14 08:29	11.62
Hexachlorobutadiene	ND		12		ppb v/v			03/13/14 08:29	11.62
Methylene Chloride	12		5.8		ppb v/v			03/13/14 08:29	11.62
m-Xylene & p-Xylene	13		2.3		ppb v/v			03/13/14 08:29	11.62
o-Xylene	7.3		2.3		ppb v/v			03/13/14 08:29	11.62
Styrene	ND		2.3		ppb v/v			03/13/14 08:29	11.62
1,1,2,2-Tetrachloroethane	ND		2.3		ppb v/v			03/13/14 08:29	11.62
Tetrachloroethene	ND		2.3		ppb v/v			03/13/14 08:29	11.62
Toluene	32		2.3		ppb v/v			03/13/14 08:29	11.62
trans-1,3-Dichloropropene	ND		2.3		ppb v/v			03/13/14 08:29	11.62
1,2,4-Trichlorobenzene	ND		12		ppb v/v			03/13/14 08:29	11.62
1,1,1-Trichloroethane	ND		2.3		ppb v/v			03/13/14 08:29	11.62
1,1,2-Trichloroethane	ND		2.3		ppb v/v			03/13/14 08:29	11.62
Trichloroethene	ND		2.3		ppb v/v			03/13/14 08:29	11.62
Trichlorofluoromethane	ND		2.3		ppb v/v			03/13/14 08:29	11.62
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.3		ppb v/v			03/13/14 08:29	11.62
1,2,4-Trimethylbenzene	6.8		2.3		ppb v/v			03/13/14 08:29	11.62
1,3,5-Trimethylbenzene	ND		2.3		ppb v/v			03/13/14 08:29	11.62
Vinyl chloride	ND		2.3		ppb v/v			03/13/14 08:29	11.62

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	43		7.4		ug/m3			03/13/14 08:29	11.62
Benzyl chloride	ND		24		ug/m3			03/13/14 08:29	11.62
Bromomethane	ND		9.0		ug/m3			03/13/14 08:29	11.62
Carbon tetrachloride	ND		15		ug/m3			03/13/14 08:29	11.62
Chlorobenzene	14		11		ug/m3			03/13/14 08:29	11.62
Chloroethane	ND		6.1		ug/m3			03/13/14 08:29	11.62
Chloroform	ND		11		ug/m3			03/13/14 08:29	11.62
Chloromethane	20		12		ug/m3			03/13/14 08:29	11.62

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV3-10

Lab Sample ID: 140-1006-5

Date Collected: 03/05/14 17:33

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		9.2		ug/m3			03/13/14 08:29	11.62
cis-1,3-Dichloropropene	ND		11		ug/m3			03/13/14 08:29	11.62
1,2-Dibromoethane (EDB)	ND		18		ug/m3			03/13/14 08:29	11.62
1,2-Dichlorobenzene	ND		14		ug/m3			03/13/14 08:29	11.62
1,3-Dichlorobenzene	ND		14		ug/m3			03/13/14 08:29	11.62
1,4-Dichlorobenzene	ND		14		ug/m3			03/13/14 08:29	11.62
Dichlorodifluoromethane	ND		11		ug/m3			03/13/14 08:29	11.62
1,1-Dichloroethane	18		9.4		ug/m3			03/13/14 08:29	11.62
1,2-Dichloroethane	22		9.4		ug/m3			03/13/14 08:29	11.62
1,1-Dichloroethene	ND		9.2		ug/m3			03/13/14 08:29	11.62
1,2-Dichloropropane	ND		11		ug/m3			03/13/14 08:29	11.62
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		16		ug/m3			03/13/14 08:29	11.62
Ethylbenzene	52		10		ug/m3			03/13/14 08:29	11.62
Hexachlorobutadiene	ND		120		ug/m3			03/13/14 08:29	11.62
Methylene Chloride	40		20		ug/m3			03/13/14 08:29	11.62
m-Xylene & p-Xylene	56		10		ug/m3			03/13/14 08:29	11.62
o-Xylene	32		10		ug/m3			03/13/14 08:29	11.62
Styrene	ND		9.9		ug/m3			03/13/14 08:29	11.62
1,1,2,2-Tetrachloroethane	ND		16		ug/m3			03/13/14 08:29	11.62
Tetrachloroethene	ND		16		ug/m3			03/13/14 08:29	11.62
Toluene	120		8.8		ug/m3			03/13/14 08:29	11.62
trans-1,3-Dichloropropene	ND		11		ug/m3			03/13/14 08:29	11.62
1,2,4-Trichlorobenzene	ND		86		ug/m3			03/13/14 08:29	11.62
1,1,1-Trichloroethane	ND		13		ug/m3			03/13/14 08:29	11.62
1,1,2-Trichloroethane	ND		13		ug/m3			03/13/14 08:29	11.62
Trichloroethene	ND		12		ug/m3			03/13/14 08:29	11.62
Trichlorofluoromethane	ND		13		ug/m3			03/13/14 08:29	11.62
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		18		ug/m3			03/13/14 08:29	11.62
1,2,4-Trimethylbenzene	34		11		ug/m3			03/13/14 08:29	11.62
1,3,5-Trimethylbenzene	ND		11		ug/m3			03/13/14 08:29	11.62
Vinyl chloride	ND		5.9		ug/m3			03/13/14 08:29	11.62

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		60 - 140		03/13/14 08:29	11.62

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV5-7

Lab Sample ID: 140-1006-6

Date Collected: 03/05/14 17:07

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0		ppb v/v			03/13/14 02:12	1
Benzyl chloride	ND		4.0		ppb v/v			03/13/14 02:12	1
Bromomethane	ND		2.0		ppb v/v			03/13/14 02:12	1
Carbon tetrachloride	ND		2.0		ppb v/v			03/13/14 02:12	1
Chlorobenzene	ND		2.0		ppb v/v			03/13/14 02:12	1
Chloroethane	ND		2.0		ppb v/v			03/13/14 02:12	1
Chloroform	ND		2.0		ppb v/v			03/13/14 02:12	1
Chloromethane	ND		5.0		ppb v/v			03/13/14 02:12	1
cis-1,2-Dichloroethene	ND		2.0		ppb v/v			03/13/14 02:12	1
cis-1,3-Dichloropropene	ND		2.0		ppb v/v			03/13/14 02:12	1
1,2-Dibromoethane (EDB)	ND		2.0		ppb v/v			03/13/14 02:12	1
1,2-Dichlorobenzene	ND		2.0		ppb v/v			03/13/14 02:12	1
1,3-Dichlorobenzene	ND		2.0		ppb v/v			03/13/14 02:12	1
1,4-Dichlorobenzene	ND		2.0		ppb v/v			03/13/14 02:12	1
Dichlorodifluoromethane	ND		2.0		ppb v/v			03/13/14 02:12	1
1,1-Dichloroethane	ND		2.0		ppb v/v			03/13/14 02:12	1
1,2-Dichloroethane	ND		2.0		ppb v/v			03/13/14 02:12	1
1,1-Dichloroethene	ND		2.0		ppb v/v			03/13/14 02:12	1
1,2-Dichloropropane	ND		2.0		ppb v/v			03/13/14 02:12	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0		ppb v/v			03/13/14 02:12	1
Ethylbenzene	ND		2.0		ppb v/v			03/13/14 02:12	1
Hexachlorobutadiene	ND		10		ppb v/v			03/13/14 02:12	1
Methylene Chloride	ND		5.0		ppb v/v			03/13/14 02:12	1
m-Xylene & p-Xylene	3.1		2.0		ppb v/v			03/13/14 02:12	1
o-Xylene	ND		2.0		ppb v/v			03/13/14 02:12	1
Styrene	ND		2.0		ppb v/v			03/13/14 02:12	1
1,1,2,2-Tetrachloroethane	ND		2.0		ppb v/v			03/13/14 02:12	1
Tetrachloroethene	ND		2.0		ppb v/v			03/13/14 02:12	1
Toluene	3.6		2.0		ppb v/v			03/13/14 02:12	1
trans-1,3-Dichloropropene	ND		2.0		ppb v/v			03/13/14 02:12	1
1,2,4-Trichlorobenzene	ND		10		ppb v/v			03/13/14 02:12	1
1,1,1-Trichloroethane	ND		2.0		ppb v/v			03/13/14 02:12	1
1,1,2-Trichloroethane	ND		2.0		ppb v/v			03/13/14 02:12	1
Trichloroethene	ND		2.0		ppb v/v			03/13/14 02:12	1
Trichlorofluoromethane	ND		2.0		ppb v/v			03/13/14 02:12	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0		ppb v/v			03/13/14 02:12	1
1,2,4-Trimethylbenzene	2.7		2.0		ppb v/v			03/13/14 02:12	1
1,3,5-Trimethylbenzene	ND		2.0		ppb v/v			03/13/14 02:12	1
Vinyl chloride	ND		2.0		ppb v/v			03/13/14 02:12	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		6.4		ug/m3			03/13/14 02:12	1
Benzyl chloride	ND		21		ug/m3			03/13/14 02:12	1
Bromomethane	ND		7.8		ug/m3			03/13/14 02:12	1
Carbon tetrachloride	ND		13		ug/m3			03/13/14 02:12	1
Chlorobenzene	ND		9.2		ug/m3			03/13/14 02:12	1
Chloroethane	ND		5.3		ug/m3			03/13/14 02:12	1
Chloroform	ND		9.8		ug/m3			03/13/14 02:12	1
Chloromethane	ND		10		ug/m3			03/13/14 02:12	1

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV5-7

Lab Sample ID: 140-1006-6

Date Collected: 03/05/14 17:07

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		7.9		ug/m3			03/13/14 02:12	1
cis-1,3-Dichloropropene	ND		9.1		ug/m3			03/13/14 02:12	1
1,2-Dibromoethane (EDB)	ND		15		ug/m3			03/13/14 02:12	1
1,2-Dichlorobenzene	ND		12		ug/m3			03/13/14 02:12	1
1,3-Dichlorobenzene	ND		12		ug/m3			03/13/14 02:12	1
1,4-Dichlorobenzene	ND		12		ug/m3			03/13/14 02:12	1
Dichlorodifluoromethane	ND		9.9		ug/m3			03/13/14 02:12	1
1,1-Dichloroethane	ND		8.1		ug/m3			03/13/14 02:12	1
1,2-Dichloroethane	ND		8.1		ug/m3			03/13/14 02:12	1
1,1-Dichloroethene	ND		7.9		ug/m3			03/13/14 02:12	1
1,2-Dichloropropane	ND		9.2		ug/m3			03/13/14 02:12	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14		ug/m3			03/13/14 02:12	1
Ethylbenzene	ND		8.7		ug/m3			03/13/14 02:12	1
Hexachlorobutadiene	ND		110		ug/m3			03/13/14 02:12	1
Methylene Chloride	ND		17		ug/m3			03/13/14 02:12	1
m-Xylene & p-Xylene	13		8.7		ug/m3			03/13/14 02:12	1
o-Xylene	ND		8.7		ug/m3			03/13/14 02:12	1
Styrene	ND		8.5		ug/m3			03/13/14 02:12	1
1,1,2,2-Tetrachloroethane	ND		14		ug/m3			03/13/14 02:12	1
Tetrachloroethene	ND		14		ug/m3			03/13/14 02:12	1
Toluene	14		7.5		ug/m3			03/13/14 02:12	1
trans-1,3-Dichloropropene	ND		9.1		ug/m3			03/13/14 02:12	1
1,2,4-Trichlorobenzene	ND		74		ug/m3			03/13/14 02:12	1
1,1,1-Trichloroethane	ND		11		ug/m3			03/13/14 02:12	1
1,1,2-Trichloroethane	ND		11		ug/m3			03/13/14 02:12	1
Trichloroethene	ND		11		ug/m3			03/13/14 02:12	1
Trichlorofluoromethane	ND		11		ug/m3			03/13/14 02:12	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15		ug/m3			03/13/14 02:12	1
1,2,4-Trimethylbenzene	13		9.8		ug/m3			03/13/14 02:12	1
1,3,5-Trimethylbenzene	ND		9.8		ug/m3			03/13/14 02:12	1
Vinyl chloride	ND		5.1		ug/m3			03/13/14 02:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		60 - 140					03/13/14 02:12	1

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV9-10

Lab Sample ID: 140-1006-7

Date Collected: 03/06/14 09:50

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	4.1		2.0		ppb v/v			03/13/14 03:06	1
Benzyl chloride	ND		4.0		ppb v/v			03/13/14 03:06	1
Bromomethane	ND		2.0		ppb v/v			03/13/14 03:06	1
Carbon tetrachloride	ND		2.0		ppb v/v			03/13/14 03:06	1
Chlorobenzene	ND		2.0		ppb v/v			03/13/14 03:06	1
Chloroethane	ND		2.0		ppb v/v			03/13/14 03:06	1
Chloroform	ND		2.0		ppb v/v			03/13/14 03:06	1
Chloromethane	ND		5.0		ppb v/v			03/13/14 03:06	1
cis-1,2-Dichloroethene	ND		2.0		ppb v/v			03/13/14 03:06	1
cis-1,3-Dichloropropene	ND		2.0		ppb v/v			03/13/14 03:06	1
1,2-Dibromoethane (EDB)	ND		2.0		ppb v/v			03/13/14 03:06	1
1,2-Dichlorobenzene	ND		2.0		ppb v/v			03/13/14 03:06	1
1,3-Dichlorobenzene	ND		2.0		ppb v/v			03/13/14 03:06	1
1,4-Dichlorobenzene	ND		2.0		ppb v/v			03/13/14 03:06	1
Dichlorodifluoromethane	ND		2.0		ppb v/v			03/13/14 03:06	1
1,1-Dichloroethane	ND		2.0		ppb v/v			03/13/14 03:06	1
1,2-Dichloroethane	ND		2.0		ppb v/v			03/13/14 03:06	1
1,1-Dichloroethene	ND		2.0		ppb v/v			03/13/14 03:06	1
1,2-Dichloropropane	ND		2.0		ppb v/v			03/13/14 03:06	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0		ppb v/v			03/13/14 03:06	1
Ethylbenzene	2.3		2.0		ppb v/v			03/13/14 03:06	1
Hexachlorobutadiene	ND		10		ppb v/v			03/13/14 03:06	1
Methylene Chloride	ND		5.0		ppb v/v			03/13/14 03:06	1
m-Xylene & p-Xylene	8.8		2.0		ppb v/v			03/13/14 03:06	1
o-Xylene	4.2		2.0		ppb v/v			03/13/14 03:06	1
Styrene	ND		2.0		ppb v/v			03/13/14 03:06	1
1,1,2,2-Tetrachloroethane	ND		2.0		ppb v/v			03/13/14 03:06	1
Tetrachloroethene	ND		2.0		ppb v/v			03/13/14 03:06	1
Toluene	13		2.0		ppb v/v			03/13/14 03:06	1
trans-1,3-Dichloropropene	ND		2.0		ppb v/v			03/13/14 03:06	1
1,2,4-Trichlorobenzene	ND		10		ppb v/v			03/13/14 03:06	1
1,1,1-Trichloroethane	ND		2.0		ppb v/v			03/13/14 03:06	1
1,1,2-Trichloroethane	ND		2.0		ppb v/v			03/13/14 03:06	1
Trichloroethene	ND		2.0		ppb v/v			03/13/14 03:06	1
Trichlorofluoromethane	ND		2.0		ppb v/v			03/13/14 03:06	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0		ppb v/v			03/13/14 03:06	1
1,2,4-Trimethylbenzene	4.6		2.0		ppb v/v			03/13/14 03:06	1
1,3,5-Trimethylbenzene	ND		2.0		ppb v/v			03/13/14 03:06	1
Vinyl chloride	ND		2.0		ppb v/v			03/13/14 03:06	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	13		6.4		ug/m3			03/13/14 03:06	1
Benzyl chloride	ND		21		ug/m3			03/13/14 03:06	1
Bromomethane	ND		7.8		ug/m3			03/13/14 03:06	1
Carbon tetrachloride	ND		13		ug/m3			03/13/14 03:06	1
Chlorobenzene	ND		9.2		ug/m3			03/13/14 03:06	1
Chloroethane	ND		5.3		ug/m3			03/13/14 03:06	1
Chloroform	ND		9.8		ug/m3			03/13/14 03:06	1
Chloromethane	ND		10		ug/m3			03/13/14 03:06	1

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV9-10

Lab Sample ID: 140-1006-7

Date Collected: 03/06/14 09:50

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		7.9		ug/m3			03/13/14 03:06	1
cis-1,3-Dichloropropene	ND		9.1		ug/m3			03/13/14 03:06	1
1,2-Dibromoethane (EDB)	ND		15		ug/m3			03/13/14 03:06	1
1,2-Dichlorobenzene	ND		12		ug/m3			03/13/14 03:06	1
1,3-Dichlorobenzene	ND		12		ug/m3			03/13/14 03:06	1
1,4-Dichlorobenzene	ND		12		ug/m3			03/13/14 03:06	1
Dichlorodifluoromethane	ND		9.9		ug/m3			03/13/14 03:06	1
1,1-Dichloroethane	ND		8.1		ug/m3			03/13/14 03:06	1
1,2-Dichloroethane	ND		8.1		ug/m3			03/13/14 03:06	1
1,1-Dichloroethene	ND		7.9		ug/m3			03/13/14 03:06	1
1,2-Dichloropropane	ND		9.2		ug/m3			03/13/14 03:06	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14		ug/m3			03/13/14 03:06	1
Ethylbenzene	10		8.7		ug/m3			03/13/14 03:06	1
Hexachlorobutadiene	ND		110		ug/m3			03/13/14 03:06	1
Methylene Chloride	ND		17		ug/m3			03/13/14 03:06	1
m-Xylene & p-Xylene	38		8.7		ug/m3			03/13/14 03:06	1
o-Xylene	18		8.7		ug/m3			03/13/14 03:06	1
Styrene	ND		8.5		ug/m3			03/13/14 03:06	1
1,1,2,2-Tetrachloroethane	ND		14		ug/m3			03/13/14 03:06	1
Tetrachloroethene	ND		14		ug/m3			03/13/14 03:06	1
Toluene	47		7.5		ug/m3			03/13/14 03:06	1
trans-1,3-Dichloropropene	ND		9.1		ug/m3			03/13/14 03:06	1
1,2,4-Trichlorobenzene	ND		74		ug/m3			03/13/14 03:06	1
1,1,1-Trichloroethane	ND		11		ug/m3			03/13/14 03:06	1
1,1,2-Trichloroethane	ND		11		ug/m3			03/13/14 03:06	1
Trichloroethene	ND		11		ug/m3			03/13/14 03:06	1
Trichlorofluoromethane	ND		11		ug/m3			03/13/14 03:06	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15		ug/m3			03/13/14 03:06	1
1,2,4-Trimethylbenzene	23		9.8		ug/m3			03/13/14 03:06	1
1,3,5-Trimethylbenzene	ND		9.8		ug/m3			03/13/14 03:06	1
Vinyl chloride	ND		5.1		ug/m3			03/13/14 03:06	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		60 - 140		03/13/14 03:06	1

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV4-15

Lab Sample ID: 140-1006-8

Date Collected: 03/06/14 10:25

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	6.7		2.0		ppb v/v			03/13/14 04:00	1.25
Benzyl chloride	ND		4.0		ppb v/v			03/13/14 04:00	1.25
Bromomethane	ND		2.0		ppb v/v			03/13/14 04:00	1.25
Carbon tetrachloride	ND		2.0		ppb v/v			03/13/14 04:00	1.25
Chlorobenzene	ND		2.0		ppb v/v			03/13/14 04:00	1.25
Chloroethane	ND		2.0		ppb v/v			03/13/14 04:00	1.25
Chloroform	ND		2.0		ppb v/v			03/13/14 04:00	1.25
Chloromethane	ND		5.0		ppb v/v			03/13/14 04:00	1.25
cis-1,2-Dichloroethene	ND		2.0		ppb v/v			03/13/14 04:00	1.25
cis-1,3-Dichloropropene	ND		2.0		ppb v/v			03/13/14 04:00	1.25
1,2-Dibromoethane (EDB)	ND		2.0		ppb v/v			03/13/14 04:00	1.25
1,2-Dichlorobenzene	ND		2.0		ppb v/v			03/13/14 04:00	1.25
1,3-Dichlorobenzene	ND		2.0		ppb v/v			03/13/14 04:00	1.25
1,4-Dichlorobenzene	ND		2.0		ppb v/v			03/13/14 04:00	1.25
Dichlorodifluoromethane	ND		2.0		ppb v/v			03/13/14 04:00	1.25
1,1-Dichloroethane	ND		2.0		ppb v/v			03/13/14 04:00	1.25
1,2-Dichloroethane	ND		2.0		ppb v/v			03/13/14 04:00	1.25
1,1-Dichloroethene	ND		2.0		ppb v/v			03/13/14 04:00	1.25
1,2-Dichloropropane	ND		2.0		ppb v/v			03/13/14 04:00	1.25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0		ppb v/v			03/13/14 04:00	1.25
Ethylbenzene	11		2.0		ppb v/v			03/13/14 04:00	1.25
Hexachlorobutadiene	ND		10		ppb v/v			03/13/14 04:00	1.25
Methylene Chloride	ND		5.0		ppb v/v			03/13/14 04:00	1.25
m-Xylene & p-Xylene	29		2.0		ppb v/v			03/13/14 04:00	1.25
o-Xylene	11		2.0		ppb v/v			03/13/14 04:00	1.25
Styrene	ND		2.0		ppb v/v			03/13/14 04:00	1.25
1,1,2,2-Tetrachloroethane	ND		2.0		ppb v/v			03/13/14 04:00	1.25
Tetrachloroethene	ND		2.0		ppb v/v			03/13/14 04:00	1.25
Toluene	30		2.0		ppb v/v			03/13/14 04:00	1.25
trans-1,3-Dichloropropene	ND		2.0		ppb v/v			03/13/14 04:00	1.25
1,2,4-Trichlorobenzene	ND		10		ppb v/v			03/13/14 04:00	1.25
1,1,1-Trichloroethane	ND		2.0		ppb v/v			03/13/14 04:00	1.25
1,1,2-Trichloroethane	ND		2.0		ppb v/v			03/13/14 04:00	1.25
Trichloroethene	ND		2.0		ppb v/v			03/13/14 04:00	1.25
Trichlorofluoromethane	ND		2.0		ppb v/v			03/13/14 04:00	1.25
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0		ppb v/v			03/13/14 04:00	1.25
1,2,4-Trimethylbenzene	11		2.0		ppb v/v			03/13/14 04:00	1.25
1,3,5-Trimethylbenzene	2.7		2.0		ppb v/v			03/13/14 04:00	1.25
Vinyl chloride	ND		2.0		ppb v/v			03/13/14 04:00	1.25

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	21		6.4		ug/m3			03/13/14 04:00	1.25
Benzyl chloride	ND		21		ug/m3			03/13/14 04:00	1.25
Bromomethane	ND		7.8		ug/m3			03/13/14 04:00	1.25
Carbon tetrachloride	ND		13		ug/m3			03/13/14 04:00	1.25
Chlorobenzene	ND		9.2		ug/m3			03/13/14 04:00	1.25
Chloroethane	ND		5.3		ug/m3			03/13/14 04:00	1.25
Chloroform	ND		9.8		ug/m3			03/13/14 04:00	1.25
Chloromethane	ND		10		ug/m3			03/13/14 04:00	1.25

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV4-15

Lab Sample ID: 140-1006-8

Date Collected: 03/06/14 10:25

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		7.9		ug/m3			03/13/14 04:00	1.25
cis-1,3-Dichloropropene	ND		9.1		ug/m3			03/13/14 04:00	1.25
1,2-Dibromoethane (EDB)	ND		15		ug/m3			03/13/14 04:00	1.25
1,2-Dichlorobenzene	ND		12		ug/m3			03/13/14 04:00	1.25
1,3-Dichlorobenzene	ND		12		ug/m3			03/13/14 04:00	1.25
1,4-Dichlorobenzene	ND		12		ug/m3			03/13/14 04:00	1.25
Dichlorodifluoromethane	ND		9.9		ug/m3			03/13/14 04:00	1.25
1,1-Dichloroethane	ND		8.1		ug/m3			03/13/14 04:00	1.25
1,2-Dichloroethane	ND		8.1		ug/m3			03/13/14 04:00	1.25
1,1-Dichloroethene	ND		7.9		ug/m3			03/13/14 04:00	1.25
1,2-Dichloropropane	ND		9.2		ug/m3			03/13/14 04:00	1.25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14		ug/m3			03/13/14 04:00	1.25
Ethylbenzene	48		8.7		ug/m3			03/13/14 04:00	1.25
Hexachlorobutadiene	ND		110		ug/m3			03/13/14 04:00	1.25
Methylene Chloride	ND		17		ug/m3			03/13/14 04:00	1.25
m-Xylene & p-Xylene	130		8.7		ug/m3			03/13/14 04:00	1.25
o-Xylene	47		8.7		ug/m3			03/13/14 04:00	1.25
Styrene	ND		8.5		ug/m3			03/13/14 04:00	1.25
1,1,2,2-Tetrachloroethane	ND		14		ug/m3			03/13/14 04:00	1.25
Tetrachloroethene	ND		14		ug/m3			03/13/14 04:00	1.25
Toluene	110		7.5		ug/m3			03/13/14 04:00	1.25
trans-1,3-Dichloropropene	ND		9.1		ug/m3			03/13/14 04:00	1.25
1,2,4-Trichlorobenzene	ND		74		ug/m3			03/13/14 04:00	1.25
1,1,1-Trichloroethane	ND		11		ug/m3			03/13/14 04:00	1.25
1,1,2-Trichloroethane	ND		11		ug/m3			03/13/14 04:00	1.25
Trichloroethene	ND		11		ug/m3			03/13/14 04:00	1.25
Trichlorofluoromethane	ND		11		ug/m3			03/13/14 04:00	1.25
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15		ug/m3			03/13/14 04:00	1.25
1,2,4-Trimethylbenzene	56		9.8		ug/m3			03/13/14 04:00	1.25
1,3,5-Trimethylbenzene	14		9.8		ug/m3			03/13/14 04:00	1.25
Vinyl chloride	ND		5.1		ug/m3			03/13/14 04:00	1.25
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		60 - 140					03/13/14 04:00	1.25

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-9

Client Sample ID: SMSSV6-5

Lab Sample ID: 140-1006-9

Date Collected: 03/06/14 10:50

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.8		ppb v/v			03/13/14 04:54	1
Benzyl chloride	ND		3.6		ppb v/v			03/13/14 04:54	1
Bromomethane	ND		1.8		ppb v/v			03/13/14 04:54	1
Carbon tetrachloride	ND		1.8		ppb v/v			03/13/14 04:54	1
Chlorobenzene	ND		1.8		ppb v/v			03/13/14 04:54	1
Chloroethane	ND		1.8		ppb v/v			03/13/14 04:54	1
Chloroform	ND		1.8		ppb v/v			03/13/14 04:54	1
Chloromethane	ND		4.5		ppb v/v			03/13/14 04:54	1
cis-1,2-Dichloroethene	ND		1.8		ppb v/v			03/13/14 04:54	1
cis-1,3-Dichloropropene	ND		1.8		ppb v/v			03/13/14 04:54	1
1,2-Dibromoethane (EDB)	ND		1.8		ppb v/v			03/13/14 04:54	1
1,2-Dichlorobenzene	ND		1.8		ppb v/v			03/13/14 04:54	1
1,3-Dichlorobenzene	ND		1.8		ppb v/v			03/13/14 04:54	1
1,4-Dichlorobenzene	ND		1.8		ppb v/v			03/13/14 04:54	1
Dichlorodifluoromethane	ND		1.8		ppb v/v			03/13/14 04:54	1
1,1-Dichloroethane	ND		1.8		ppb v/v			03/13/14 04:54	1
1,2-Dichloroethane	ND		1.8		ppb v/v			03/13/14 04:54	1
1,1-Dichloroethene	ND		1.8		ppb v/v			03/13/14 04:54	1
1,2-Dichloropropane	ND		1.8		ppb v/v			03/13/14 04:54	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.8		ppb v/v			03/13/14 04:54	1
Ethylbenzene	ND		1.8		ppb v/v			03/13/14 04:54	1
Hexachlorobutadiene	ND		9.1		ppb v/v			03/13/14 04:54	1
Methylene Chloride	ND		4.5		ppb v/v			03/13/14 04:54	1
m-Xylene & p-Xylene	5.7		1.8		ppb v/v			03/13/14 04:54	1
o-Xylene	2.4		1.8		ppb v/v			03/13/14 04:54	1
Styrene	ND		1.8		ppb v/v			03/13/14 04:54	1
1,1,2,2-Tetrachloroethane	ND		1.8		ppb v/v			03/13/14 04:54	1
Tetrachloroethene	ND		1.8		ppb v/v			03/13/14 04:54	1
Toluene	2.9		1.8		ppb v/v			03/13/14 04:54	1
trans-1,3-Dichloropropene	ND		1.8		ppb v/v			03/13/14 04:54	1
1,2,4-Trichlorobenzene	ND		9.1		ppb v/v			03/13/14 04:54	1
1,1,1-Trichloroethane	ND		1.8		ppb v/v			03/13/14 04:54	1
1,1,2-Trichloroethane	ND		1.8		ppb v/v			03/13/14 04:54	1
Trichloroethene	ND		1.8		ppb v/v			03/13/14 04:54	1
Trichlorofluoromethane	ND		1.8		ppb v/v			03/13/14 04:54	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.8		ppb v/v			03/13/14 04:54	1
1,2,4-Trimethylbenzene	2.6		1.8		ppb v/v			03/13/14 04:54	1
1,3,5-Trimethylbenzene	ND		1.8		ppb v/v			03/13/14 04:54	1
Vinyl chloride	ND		1.8		ppb v/v			03/13/14 04:54	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.8		ug/m3			03/13/14 04:54	1
Benzyl chloride	ND		19		ug/m3			03/13/14 04:54	1
Bromomethane	ND		7.1		ug/m3			03/13/14 04:54	1
Carbon tetrachloride	ND		11		ug/m3			03/13/14 04:54	1
Chlorobenzene	ND		8.4		ug/m3			03/13/14 04:54	1
Chloroethane	ND		4.8		ug/m3			03/13/14 04:54	1
Chloroform	ND		8.9		ug/m3			03/13/14 04:54	1
Chloromethane	ND		9.4		ug/m3			03/13/14 04:54	1

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV6-5

Lab Sample ID: 140-1006-9

Date Collected: 03/06/14 10:50

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		7.2		ug/m3			03/13/14 04:54	1
cis-1,3-Dichloropropene	ND		8.3		ug/m3			03/13/14 04:54	1
1,2-Dibromoethane (EDB)	ND		14		ug/m3			03/13/14 04:54	1
1,2-Dichlorobenzene	ND		11		ug/m3			03/13/14 04:54	1
1,3-Dichlorobenzene	ND		11		ug/m3			03/13/14 04:54	1
1,4-Dichlorobenzene	ND		11		ug/m3			03/13/14 04:54	1
Dichlorodifluoromethane	ND		9.0		ug/m3			03/13/14 04:54	1
1,1-Dichloroethane	ND		7.4		ug/m3			03/13/14 04:54	1
1,2-Dichloroethane	ND		7.4		ug/m3			03/13/14 04:54	1
1,1-Dichloroethene	ND		7.2		ug/m3			03/13/14 04:54	1
1,2-Dichloropropane	ND		8.4		ug/m3			03/13/14 04:54	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		13		ug/m3			03/13/14 04:54	1
Ethylbenzene	ND		7.9		ug/m3			03/13/14 04:54	1
Hexachlorobutadiene	ND		97		ug/m3			03/13/14 04:54	1
Methylene Chloride	ND		16		ug/m3			03/13/14 04:54	1
m-Xylene & p-Xylene	25		7.9		ug/m3			03/13/14 04:54	1
o-Xylene	10		7.9		ug/m3			03/13/14 04:54	1
Styrene	ND		7.7		ug/m3			03/13/14 04:54	1
1,1,2,2-Tetrachloroethane	ND		12		ug/m3			03/13/14 04:54	1
Tetrachloroethene	ND		12		ug/m3			03/13/14 04:54	1
Toluene	11		6.9		ug/m3			03/13/14 04:54	1
trans-1,3-Dichloropropene	ND		8.3		ug/m3			03/13/14 04:54	1
1,2,4-Trichlorobenzene	ND		67		ug/m3			03/13/14 04:54	1
1,1,1-Trichloroethane	ND		9.9		ug/m3			03/13/14 04:54	1
1,1,2-Trichloroethane	ND		9.9		ug/m3			03/13/14 04:54	1
Trichloroethene	ND		9.8		ug/m3			03/13/14 04:54	1
Trichlorofluoromethane	ND		10		ug/m3			03/13/14 04:54	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		14		ug/m3			03/13/14 04:54	1
1,2,4-Trimethylbenzene	13		8.9		ug/m3			03/13/14 04:54	1
1,3,5-Trimethylbenzene	ND		8.9		ug/m3			03/13/14 04:54	1
Vinyl chloride	ND		4.6		ug/m3			03/13/14 04:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		60 - 140					03/13/14 04:54	1

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV7-3

Lab Sample ID: 140-1006-10

Date Collected: 03/06/14 11:25

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		3.6		ppb v/v			03/13/14 05:48	1
Benzyl chloride	ND		7.3		ppb v/v			03/13/14 05:48	1
Bromomethane	ND		3.6		ppb v/v			03/13/14 05:48	1
Carbon tetrachloride	ND		3.6		ppb v/v			03/13/14 05:48	1
Chlorobenzene	ND		3.6		ppb v/v			03/13/14 05:48	1
Chloroethane	ND		3.6		ppb v/v			03/13/14 05:48	1
Chloroform	ND		3.6		ppb v/v			03/13/14 05:48	1
Chloromethane	ND		9.1		ppb v/v			03/13/14 05:48	1
cis-1,2-Dichloroethene	ND		3.6		ppb v/v			03/13/14 05:48	1
cis-1,3-Dichloropropene	ND		3.6		ppb v/v			03/13/14 05:48	1
1,2-Dibromoethane (EDB)	ND		3.6		ppb v/v			03/13/14 05:48	1
1,2-Dichlorobenzene	ND		3.6		ppb v/v			03/13/14 05:48	1
1,3-Dichlorobenzene	ND		3.6		ppb v/v			03/13/14 05:48	1
1,4-Dichlorobenzene	ND		3.6		ppb v/v			03/13/14 05:48	1
Dichlorodifluoromethane	ND		3.6		ppb v/v			03/13/14 05:48	1
1,1-Dichloroethane	ND		3.6		ppb v/v			03/13/14 05:48	1
1,2-Dichloroethane	ND		3.6		ppb v/v			03/13/14 05:48	1
1,1-Dichloroethene	ND		3.6		ppb v/v			03/13/14 05:48	1
1,2-Dichloropropane	ND		3.6		ppb v/v			03/13/14 05:48	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.6		ppb v/v			03/13/14 05:48	1
Ethylbenzene	ND		3.6		ppb v/v			03/13/14 05:48	1
Hexachlorobutadiene	ND		18		ppb v/v			03/13/14 05:48	1
Methylene Chloride	ND		9.1		ppb v/v			03/13/14 05:48	1
m-Xylene & p-Xylene	5.3		3.6		ppb v/v			03/13/14 05:48	1
o-Xylene	ND		3.6		ppb v/v			03/13/14 05:48	1
Styrene	ND		3.6		ppb v/v			03/13/14 05:48	1
1,1,2,2-Tetrachloroethane	ND		3.6		ppb v/v			03/13/14 05:48	1
Tetrachloroethene	ND		3.6		ppb v/v			03/13/14 05:48	1
Toluene	3.7		3.6		ppb v/v			03/13/14 05:48	1
trans-1,3-Dichloropropene	ND		3.6		ppb v/v			03/13/14 05:48	1
1,2,4-Trichlorobenzene	ND		18		ppb v/v			03/13/14 05:48	1
1,1,1-Trichloroethane	ND		3.6		ppb v/v			03/13/14 05:48	1
1,1,2-Trichloroethane	ND		3.6		ppb v/v			03/13/14 05:48	1
Trichloroethene	ND		3.6		ppb v/v			03/13/14 05:48	1
Trichlorofluoromethane	ND		3.6		ppb v/v			03/13/14 05:48	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.6		ppb v/v			03/13/14 05:48	1
1,2,4-Trimethylbenzene	4.5		3.6		ppb v/v			03/13/14 05:48	1
1,3,5-Trimethylbenzene	ND		3.6		ppb v/v			03/13/14 05:48	1
Vinyl chloride	ND		3.6		ppb v/v			03/13/14 05:48	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		12		ug/m3			03/13/14 05:48	1
Benzyl chloride	ND		38		ug/m3			03/13/14 05:48	1
Bromomethane	ND		14		ug/m3			03/13/14 05:48	1
Carbon tetrachloride	ND		23		ug/m3			03/13/14 05:48	1
Chlorobenzene	ND		17		ug/m3			03/13/14 05:48	1
Chloroethane	ND		9.6		ug/m3			03/13/14 05:48	1
Chloroform	ND		18		ug/m3			03/13/14 05:48	1
Chloromethane	ND		19		ug/m3			03/13/14 05:48	1

TestAmerica Knoxville







# Client Sample Results

Client: J.M. Waller Associates, Inc.  
Project/Site: Smokey Mountain Smelter

TestAmerica Job ID: 140-1006-1

Client Sample ID: SMSSV7-3

Lab Sample ID: 140-1006-10

Date Collected: 03/06/14 11:25

Matrix: Air

Date Received: 03/06/14 13:45

Sample Container: Summa Canister 1L

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		14		ug/m3			03/13/14 05:48	1
cis-1,3-Dichloropropene	ND		17		ug/m3			03/13/14 05:48	1
1,2-Dibromoethane (EDB)	ND		28		ug/m3			03/13/14 05:48	1
1,2-Dichlorobenzene	ND		22		ug/m3			03/13/14 05:48	1
1,3-Dichlorobenzene	ND		22		ug/m3			03/13/14 05:48	1
1,4-Dichlorobenzene	ND		22		ug/m3			03/13/14 05:48	1
Dichlorodifluoromethane	ND		18		ug/m3			03/13/14 05:48	1
1,1-Dichloroethane	ND		15		ug/m3			03/13/14 05:48	1
1,2-Dichloroethane	ND		15		ug/m3			03/13/14 05:48	1
1,1-Dichloroethene	ND		14		ug/m3			03/13/14 05:48	1
1,2-Dichloropropane	ND		17		ug/m3			03/13/14 05:48	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		25		ug/m3			03/13/14 05:48	1
Ethylbenzene	ND		16		ug/m3			03/13/14 05:48	1
Hexachlorobutadiene	ND		190		ug/m3			03/13/14 05:48	1
Methylene Chloride	ND		32		ug/m3			03/13/14 05:48	1
m-Xylene & p-Xylene	23		16		ug/m3			03/13/14 05:48	1
o-Xylene	ND		16		ug/m3			03/13/14 05:48	1
Styrene	ND		15		ug/m3			03/13/14 05:48	1
1,1,2,2-Tetrachloroethane	ND		25		ug/m3			03/13/14 05:48	1
Tetrachloroethene	ND		25		ug/m3			03/13/14 05:48	1
Toluene	14		14		ug/m3			03/13/14 05:48	1
trans-1,3-Dichloropropene	ND		17		ug/m3			03/13/14 05:48	1
1,2,4-Trichlorobenzene	ND		130		ug/m3			03/13/14 05:48	1
1,1,1-Trichloroethane	ND		20		ug/m3			03/13/14 05:48	1
1,1,2-Trichloroethane	ND		20		ug/m3			03/13/14 05:48	1
Trichloroethene	ND		20		ug/m3			03/13/14 05:48	1
Trichlorofluoromethane	ND		20		ug/m3			03/13/14 05:48	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		28		ug/m3			03/13/14 05:48	1
1,2,4-Trimethylbenzene	22		18		ug/m3			03/13/14 05:48	1
1,3,5-Trimethylbenzene	ND		18		ug/m3			03/13/14 05:48	1
Vinyl chloride	ND		9.3		ug/m3			03/13/14 05:48	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	94		60 - 140					03/13/14 05:48	1

TestAmerica Knoxville







**Keller, Michael E.**

---

**From:** Goddard, Denise  
**Sent:** Wednesday, May 21, 2014 9:40 AM  
**To:** Keller, Michael E.  
**Cc:** Goddard, Denise  
**Subject:** FW: Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions

Michael..... A reference sample was collected at sample location SMSSV8 at 15 feet....Denise

---

**From:** Austin, Janice [<mailto:janice.austin@jmwaller.com>]  
**Sent:** Wednesday, May 21, 2014 9:34 AM  
**To:** Goddard, Denise  
**Cc:** Keller, Michael E.; Kestle, Rusty  
**Subject:** RE: Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions

Good morning,

A reference sample was collected at sample location SMSSV8 at 15 feet.

Please feel free to contact me should you have any additional questions.

Thanks,

**Janice D. Austin, P.E.**  
Project Manager

J. M. Waller Associates Inc.  
Tel: 404.443.2777 Ext.: 4030 | Cell: 904.248.1247  
100 Hartsfield Centre Parkway, Suite 610  
Atlanta, Georgia 30354-1390  
Email: [janice.austin@jmwaller.com](mailto:janice.austin@jmwaller.com) | [www.jmwaller.com](http://www.jmwaller.com)  
*A Service Disabled Veteran Owned Small Business*

---

**From:** Goddard, Denise [<mailto:Goddard.Denise@epa.gov>]  
**Sent:** Tuesday, May 20, 2014 1:57 PM  
**To:** Austin, Janice  
**Cc:** Keller, Michael E.; Kestle, Rusty; Goddard, Denise  
**Subject:** RE: Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions

Janice.....One last question. Was a control sample collected as part of this data set? Thanks....Denise

---

**From:** Austin, Janice [<mailto:janice.austin@jmwaller.com>]  
**Sent:** Tuesday, May 20, 2014 12:34 PM  
**To:** Goddard, Denise  
**Cc:** Keller, Michael E.; Kestle, Rusty  
**Subject:** RE: Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions



Denise,

I have attached the data package which contains the rinseate blank sample. Yes, the rinseate blank did not include the PE tubing. The change to PE tubing was made in the field at the direction of the RPM, Rusty Kestle. I will ensure to provide the clarification for collection of the duplicate sample.

Please feel free to let me know if you need anything further.

Thanks,

**Janice D. Austin, P.E.**  
Project Manager

J. M. Waller Associates Inc.  
Tel: 404.443.2777 Ext.: 4030 | Cell: 904.248.1247  
100 Hartsfield Centre Parkway, Suite 610  
Atlanta, Georgia 30354-1390  
Email: [janice.austin@jmwaller.com](mailto:janice.austin@jmwaller.com) | [www.jmwaller.com](http://www.jmwaller.com)  
*A Service Disabled Veteran Owned Small Business*

---

**From:** Goddard, Denise [<mailto:Goddard.Denise@epa.gov>]  
**Sent:** Tuesday, May 20, 2014 11:36 AM  
**To:** Austin, Janice  
**Cc:** Keller, Michael E.; Kestle, Rusty  
**Subject:** RE: Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions

Janice.....Just a few more questions for clarification. Can you send me the results of the rinseate blank and am I to assume that the rinseate blank, based on your discussion below, did not include the PE tubing? Because if the PE tubing came in contact with the soil vapor, the tubing should have been included as part of the rinseate blank. Without the tubing being a part of the rinseate blank sample, how do we know that the tubing isn't contributing to the positive results detected in the samples?

Also, it appears that the duplicate sample wasn't collected exactly as specified in the SOP (which required a tee connected to the tubing that would allow simultaneous filling of two canisters).....Thanks....Denise

---

**From:** Austin, Janice [<mailto:janice.austin@jmwaller.com>]  
**Sent:** Tuesday, May 20, 2014 11:14 AM  
**To:** Goddard, Denise  
**Cc:** Keller, Michael E.; Kestle, Rusty  
**Subject:** RE: Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions

A duplicate sample was collected at location SMSSV02. An equipment blank was not collected on the SUMMA canister as Test America was providing a batch certification for the cleanliness of the canisters. An equipment rinseate blank for the DPT PRT system was collected and submitted for analysis of VOAs and SVOAs by the CLP laboratory. A rinseate blank was not performed on the PE tubing that was used.

The samples are being collected in support of the HHRA for the RI to determine if there is a migration pathway of soil gas from the wastes consolidated onsite within the capped former waste pile and if there is any impacts to groundwater or neighboring properties. There are no buildings onsite. As a result, soil gas samples were collected and the data screened against the Vapor Intrusion Screening Levels. Of the analytes which exceeded the VISL, groundwater data for



those analytes were evaluated and screened against the target groundwater concentration and the MCL. Based on the current data set, none of the analytes which exceeded the VISL from the soil gas samples exceeded the target groundwater concentration or the MCL in the dissolved phase. However, analytes were detected within the soil gas samples collected 100 feet from neighboring residential property. As a result, JM Waller will collect time-weighted soil gas samples from the residential property in June 2014.

**Janice D. Austin, P.E.**  
Project Manager

J. M. Waller Associates Inc.  
Tel: 404.443.2777 Ext.: 4030 | Cell: 904.248.1247  
100 Hartsfield Centre Parkway, Suite 610  
Atlanta, Georgia 30354-1390  
Email: [janice.austin@jmwaller.com](mailto:janice.austin@jmwaller.com) | [www.jmwaller.com](http://www.jmwaller.com)  
*A Service Disabled Veteran Owned Small Business*

---

**From:** Goddard, Denise [<mailto:Goddard.Denise@epa.gov>]  
**Sent:** Tuesday, May 20, 2014 9:36 AM  
**To:** Austin, Janice; Kestle, Rusty  
**Cc:** Keller, Michael E.; Goddard, Denise; Kestle, Rusty  
**Subject:** RE: Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions

Janice.....Were any QC samples collected as specified in Section 2.4 of the SOP? Also, what is the soil gas data being used for (what type of decisions will be made based on this data)? Is the soil gas data being compared to some kind of screening values / levels if so, what specific screening values are being used? Thanks....Denise

---

**From:** Austin, Janice [<mailto:janice.austin@jmwaller.com>]  
**Sent:** Tuesday, May 20, 2014 9:06 AM  
**To:** Kestle, Rusty  
**Cc:** Keller, Michael E.; Goddard, Denise  
**Subject:** RE: Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions

Good morning,

In response to the additional concerns regarding the sample collection method, JM Waller offers the following comments. Please feel free to contact me should you have any additional concerns.

All samples were collected in accordance with the SESD SOP *Soil Gas Sampling* (SESDPROC-307-R2). The soil gas sampling was completed using the GeoProbe Post Run Tubing (PRT) method. The PRT soil vapor collection apparatus consisted of an expendable point which was placed in the end of DPT rods loosely within an internally threaded point holder. After the rods were pushed to the desired depth, they were retracted a few inches to expose the unsaturated soil and a threaded adapter was attached to tubing, inserted into the rods, and by twisting the tubing was threaded into the point holder down-hole. The sample was drawn through the point holder, through the adapter, and into the sample tubing. Thus eliminating contact between the sample and the inside of the rods.

At each location the rods were pushed to an appropriate depth and an area around the top of the rods was dug out and filled with granular bentonite which was then hydrated (Section 3.2, SESDPROC-307-R2). After the sampling device was deployed the tubing was purged using a syringe. The minimum purge volume of gas removed was determined as three times the tubing volume (Section 5, paragraph 1, SESDPROC-307-R2). A summary of the purge volume is provided in the table below. After purging, the tubing was attached to a RAE systems photoionization detector (PID) and allowed to



equilibrate. Stable PID readings were recorded (see tabular summary below). The tubing was sealed by kinking immediately above the PID instrument. The integrity of the seal was tested using the PID pump alarm, and the tubing was attached to a SUMMA canister and unsealed. A grab sample was collected by releasing the vacuum in the canister. Soil vapor sample details are summarized in the table below. A vacuum/pressure gauge was not utilized as the samples were collected as a discrete sample and not a time weighted sample as specified in Section 5, paragraph 2 of the SESD SOP *Soil Gas Sampling* (SESDPROC-307-R2). Tubing used for soil vapor sample collection was originally planned to be Teflon in accordance with SESD SOP, however while attempting to thread the adapter on the point holder at sample location SMSSV8, it was discovered that Teflon tubing did not have the rigidity to thread the adapter into the point holder and with the approval of the EPA RPM (Rusty Kestle) in the field, ¼-inch inner diameter polyethylene tubing was used. However, an equipment blank on the tubing was not performed in the field.

Soil Vapor Location	Date	Time	Depth (feet bls)	Purge Volume (mL)	PID Reading (ppm)
SMSSV8	3/5/14	1505	15	660	1.1
SMSSV1	3/5/14	1550	5	300	0.8
SMSSV2	3/5/14	1611	10	600	1.1
SMSSV5	3/5/14	1710	7	540	1.0
SMSSV3	3/5/14	1740	10	660	1.0
SMSSV9	3/6/14	0950	10	540	0.9
SMSSV9	3/6/14	1025	15	900	1.9
SMSSV6	3/6/14	1050	5	360	1.0
SMSSV7	3/6/14	1125	3	420	0.8

**Janice D. Austin, P.E.**  
Project Manager

J. M. Waller Associates Inc.  
Tel: 404.443.2777 Ext.: 4030 | Cell: 904.248.1247  
100 Hartsfield Centre Parkway, Suite 610  
Atlanta, Georgia 30354-1390  
Email: [janice.austin@jmwaller.com](mailto:janice.austin@jmwaller.com) | [www.jmwaller.com](http://www.jmwaller.com)  
*A Service Disabled Veteran Owned Small Business*

---

**From:** Kestle, Rusty [<mailto:Kestle.Rusty@epa.gov>]  
**Sent:** Monday, May 19, 2014 9:34 AM  
**To:** Austin, Janice  
**Cc:** Keller, Michael E.; Goddard, Denise  
**Subject:** RE: Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions

Janice,

Please see the attached comments; we may need to have a conference call to discuss. Thanks!

Rusty

---

W. Russell Kestle, Jr.  
Registered Professional Geologist (GA)  
Senior Remedial Project Manager  
Section C, Superfund Remedial Branch, Superfund Division  
U.S. Environmental Protection Agency, Region 4



11th Floor  
61 Forsyth Street, S.W.  
Atlanta, GA 30303-8909  
Telephone: (404) 562-8819

---

**From:** Goddard, Denise  
**Sent:** Monday, May 19, 2014 9:19 AM  
**To:** Kestle, Rusty  
**Cc:** Goddard, Denise; Keller, Michael E.  
**Subject:** FW: Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions

Rusty.....Can you forward this email to Janice for a response?? Thanks....Denise

---

**From:** Keller, Michael E.  
**Sent:** Friday, May 16, 2014 9:19 AM  
**To:** Goddard, Denise  
**Subject:** RE: Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions

Denise:

I have reviewed response and concerns for item #2 have been completely addressed with the extra information provided.

However regarding #1, I have learned that a separate Region 4 SOP is in place for Soil Gas Sampling which is distinct for the one developed for ambient air sampling. Collecting samples for soil gas air is very different than collecting ambient air samples. In this Soil Gas SOP Section 5 describes sampling and does include a provision for recording pressure/vacuum readings. This SOP, which I have attached a link, also covers other details involving sampling, including removal of stagnant/ambient air from sample string prior to collection and in Section 2.4 some specific Quality Control requirements (field blank, equipment rinsate blank, and field split). The original response probably is based on the ambient air SOP and not soil gas SOP.

I would recommend that we really need more information regarding sampling procedures followed to be able to wrap up review. Based on information I currently have it would appear that the appropriate SOP with its QC requirements may not have been followed raising some significant data usability concerns. Once we receive more detail regarding sampling I will be able to determine how to qualify results.

I have also attached copies of COCs, lab summa canister dilution worksheet from lab, and canisters pressures upon receipt at laboratory. These pressures range over a wide range from canister to canister.

Thanks.

Michael Keller  
Chemist (Data Validation Team Lead)  
Alion Science and Technology, Inc.  
ESAT Contractor  
USEPA Region 4/SESD  
706-355-8656



**From:** Goddard, Denise  
**Sent:** Thursday, May 15, 2014 3:59 PM  
**To:** Keller, Michael E.; Jones, Sue  
**Cc:** Goddard, Denise  
**Subject:** FW: Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions

Sue / Michael.....FYI.....

---

**From:** Austin, Janice [<mailto:janice.austin@jmwaller.com>]  
**Sent:** Thursday, May 15, 2014 3:21 PM  
**To:** Kestle, Rusty  
**Cc:** Goddard, Denise  
**Subject:** RE: Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions

Good afternoon,

Please see the responses below regarding the comments generated during data validation.

1. Vacuum gauge measurements were not recorded during this field event as the samples were collected as a grab sample and does not appear to be required per SEDS SOP. To sample, Andrew connected the SUMMA canister directly to the PRT hose and allowed it to equilibrate. Sufficient time was given in order to allow the canister to be filled. Canisters were then couriered from the site (located in Knoxville) to Test America, Knoxville the same day of sample collection in order to maintain the integrity of the sample.
2. Test America Knoxville performed a batch certification on the canisters provided for sample collection. The majority of their summa canisters are batch certified where a batch of up to 16 canisters is cleaned in the same cleaning cycle, and the canister with the highest concentration prior to cleaning is analyzed for the requested target analytes. The canister that is analyzed is referred to as the certification blank. The canisters that were used for this project were batch certified and were cleaned in two different batches, the report contains the results for two certification blanks (i.e., canister 10333 is the certification blank for can cleaning job 140-768 and canister 09587 is the certification blank for can cleaning job 140-905). Attached are copies of the canister cleaning logs for these batches. The log contains the asset tags for all of the canisters that were cleaned and will help to provide a link between the canister certification results that were provided in the report and the canisters that were used for the samples. The canisters that were used for this project have been highlighted in yellow.

Please feel free to contact me should you have any additional questions.

**Janice D. Austin, P.E.**  
Project Manager

J. M. Waller Associates Inc.  
Tel: 404.443.2777 Ext.: 4030 | Cell: 904.248.1247  
100 Hartsfield Centre Parkway, Suite 610  
Atlanta, Georgia 30354-1390  
Email: [janice.austin@jmwaller.com](mailto:janice.austin@jmwaller.com) | [www.jmwaller.com](http://www.jmwaller.com)  
*A Service Disabled Veteran Owned Small Business*

---

**From:** Kestle, Rusty [<mailto:Kestle.Rusty@epa.gov>]  
**Sent:** Monday, May 12, 2014 2:44 PM  
**To:** Austin, Janice



**Cc:** Goddard, Denise

**Subject:** FW: Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions

Janice,

Will you please address these comments? Thanks!

Rusty

---

W. Russell Kestle, Jr.  
Registered Professional Geologist (GA)  
Senior Remedial Project Manager  
Section C, Superfund Remedial Branch, Superfund Division  
U.S. Environmental Protection Agency, Region 4  
11th Floor  
61 Forsyth Street, S.W.  
Atlanta, GA 30303-8909  
Telephone: (404) 562-8819

---

**From:** Goddard, Denise  
**Sent:** Monday, May 12, 2014 2:33 PM  
**To:** Kestle, Rusty  
**Cc:** Goddard, Denise; Keller, Michael E.  
**Subject:** FW: Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions

Rusty....Can you forward this to JM Waller – we need the information requested below....Thanks....Denise

---

**From:** Keller, Michael E.  
**Sent:** Monday, May 12, 2014 1:41 PM  
**To:** Goddard, Denise  
**Subject:** Smokey Mountain Smelters (14-0103) - TO-15 soil gas samples questions

Denise:

I have looked over the data package and have a few questions to be addressed so I can wrap up my review.

(1). The COCs (pages 289 and 290) would suggest that grab samples (same start and stop time) were collected by Andrew Grimmke but do not provide any information in the columns labeled canister vacuum in field (start) and canister vacuum in field (stop). TestAmerica does show pressures @ receipt (page 291) which varied between 0.0 inches Hg to - 13.8 inches Hg. Without any measurement from field I would have no way to determine whether or not canister may have leaked (increased pressure) between collection and lab receipt. For that matter if the evacuated canister had leaked after it was evacuated but before sampling I would have no way to verify whether the intended sample was collected. Maybe this information is available elsewhere maybe in a field log.

(2). Test America does have a package section labeled "Clean Canister Certification" beginning on page 276 apparently for canister id No. 10333 (analyzed 1/23/14) and No. 09587 (analyzed 2/19/14). Neither of these were used for samples listed on COCs. TO-15 section 8.4.1.8 implies that each actual canister be tested and certified prior to use ("Any canister that has not tested clean should not be used. Once tested clean, the canisters are reevacuated ... and remain in the evacuated state until used"). The data in this "Clean Canister Certification" really can't be tied to the ten canisters used to collect sample from this site based on information in the package alone. Based on information available an assessment of canister cleanliness cannot be made and so whether positive hits reported are from sample or not



definitively. TestAmerica should be able to provide additional information on their cleaning and certification protocols to alleviate this major concern.

Please let me know if I can be of additional assistance.

Michael Keller  
Chemist (Data Validation Team Lead)  
Alion Science and Technology, Inc.  
ESAT Contractor  
USEPA Region 4/SESD  
706-355-8656



## Project DG-0728

September 08, 2014

Ms. Denise Goddard  
Environmental Protection Agency, Region 4  
Science and Ecosystem Support Division  
980 College Station Road  
Athens, GA 30605-2720

SUBJECT:	Data Review and Validation	Project No. DG-0728
	Case No. NA	ESAT TDF No. 14T0743
	Sample Nos.	SMSSV14 (140-1594-1), SMSSV15D (140-1594-2), SMSSV15 (140-1594-3), SMSSV16 (140-1594-4), SMSSV AMBIENT (140-1594-5), SMSSV10-20 (140-1594-6), SMSSV8-15 (140-1594-7), SMSSV13-11 (140-1594-8), SMSSV11-11 (140-1594-9), SMSSV9-10 (140-1594-10), SMSSV4-15 (140-1594-11), SMSSV3-10 (140-1594-12), SMSSV3D-10 (140-1594-13)
	Sampling date(s):	06/25/14
	Organic Analyses:	TestAmerica, Knoxville, TN
	Data for Site:	Smokey Mountain Smelters, Knoxville, TN
	Analysis:	TO-15 (soil gas volatiles)

Dear Ms. Goddard:

The ESAT Work Team manually reviewed a Level 4 data package for thirteen soil gas (canister) grab samples analyzed for volatiles by *USEPA Compendium Method TO-15 Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)* (January 1999). Samples were collected by J.M. Waller Associates, Inc. (Atlanta, GA). Field sampling procedures were not included in the data package and were not reviewed and evaluated.

The laboratory was not submitted a performance evaluation sample (PES).

The samples were collected on 06/25/14 and were received by the laboratory on 06/26/14.

Data review was based primarily on the TO-15 method since neither the USEPA Region 4 organic data validation SOPs nor the organic National Functional Guidelines (NFGs) were explicitly developed for this type of analysis. Particularly, calibration criteria provided in and developed for TO-15 (maximum 30% RSD for ICAL and  $\pm 30\%$  D for CCAL with no ending CCAL check required) were used instead of the tighter USEPA Region 4 criteria, which are not applicable to the air matrix.

The laboratory submitted a complete Level 4 data package which overall demonstrated acceptable method based performance. Some recommended data qualifiers are detailed below.



## **Project DG-0728**

Acceptable calibration performance including standard verifications, BFB tuning, internal standard area and retention time stability, surrogate recoveries (BFB) compliant method blank and laboratory control sample (LCS) recoveries were demonstrated. The laboratory reported a target analyte list that was a subset of the compounds present in the calibration standards and only reported positive hits that exceeded their reporting limit (RL). Values for the method detection limits (MDL) were not provided on the reporting forms. Mass spectrum were provided for all positive hits and documented identifications that were made.

The laboratory reported all results in both ppb v/v and  $\mu\text{g}/\text{m}^3$  units.

The laboratory provided the canisters used for sample analysis and provided cleaning certification data in the data package. Each canister used for this project was analyzed after cleaning and these results were provided as part of the data package.

Five samples were collected using 6 L canisters and the remaining eight samples were collected using 1 L canisters. The laboratory measured canister pressures ranging from -1.5 in. Hg to -22.0 in. Hg upon receipt (see attachment). Canister vacuum in field measurements were provided both at the start and at the stop of sample collection and were documented on the Chain of Custody (COC) Record. All canisters were fully evacuated at the start of sampling and pressures at the end of sampling reasonably agreed with those measured by the laboratory upon sample receipt. The laboratory used sample volumes of between 20 ml and 91 ml with four samples also being diluted (2.3-111X) and all were brought up to 500 ml, which was the volume used for the calibration standards. Presumably the laboratory was able to achieve the desired project reporting limits using these dilutions and reduced sample volumes.

Area counts for all positive sample hits reported were compared to the area counts for the analyte reported in the canister cleaning certification analysis. Due to variable sample volumes used merely comparing final results alone was not appropriate. Accordingly, the sample area for trichloroethene (14355) was similar to the canister check (10066) and the sample area for 1,1,2-trichloro-1,2,2-trifluoroethane (16906) was similar to the canister check (14738) for sample SMSSV AMBIENT (140-1594-5). It is recommended that both of these results be "U" qualified at the laboratory's reported values (B-4). Similarly, the sample area for toluene (97988) was less than 5X of the associated canister check (20273) for sample SMSSV11-11 (140-1594-9). It is recommended that this result be "U" qualified at the laboratory's reported value (B-4).

Please refer to the attached Data Quality Assessment Record. If you have any questions, please contact this office.

Very Truly Yours:

Michael E. Keller  
Chemist (Data Validation Team Lead)  
Alion Science and Technology



## Project DG-0728

### Data Quality Assessment Record (DQAR)

Review Date: 09/08/14      Analyses: VOA Soil Gas by TO15      Matrix: Air      Project #: DG-0728

SDG /Lab File: 140-1594-1

Laboratory : TestAmerica, Knoxville, TN

Site Name: Smokey Mountain Smelters, Knoxville, TN

Check One:    EPA    ☐ ESAT    ☐ CLP    ☐ Other (specify)    Non-CLP (RAS)

#### Sample Numbers – Lab Sample ID:

SMSSV14	140-1594-1	SMSSV3-10	140-1594-12		
SMSSV15D	140-1594-2	SMSSV3D-10	140-1594-13		
SMSSV15	140-1594-3				
SMSSV16	140-1594-4				
SMSSV AMBIENT	140-1594-5				
SMSSV10-20	140-1594-6				
SMSSV8-15	140-1594-7				
SMSSV13-11	140-1594-8				
SMSSV11-11	140-1594-9				
SMSSV9-10	140-1594-10				
SMSSV4-15	140-1594-11				

#### I. SUMMARY OF PROBLEMS AND COMMENTS:

A summary of deficiencies noted for the method used to generate data for this project is presented below. For the purposes of this review, the QC limits specified in the analytical method have been applied to the data. Data review was based primarily on the *USEPA Compendium Method TO-15 Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)* (January 1999) since neither the USEPA Region 4 organic data validation SOPs or the organic National Functional Guidelines (NFGs) were explicitly developed for this type of analysis. Particularly, calibration criteria provided by and developed for TO-15 (maximum 30% RSD for ICAL and  $\pm 30\%$  D for CCAL with no ending CCAL check required) were used instead of the tighter USEPA Region 4 criteria, which are not applicable to the air matrix.



**II. Data Quality Assessment (An explanation for any “no” answer must be provided)**

? = see remarks

**1. Summary:**

	Yes	N/A	No
Were all requested analyses performed?	<u>X</u>	<u>      </u>	<u>      </u>
Were all required OC checks performed?	<u>X</u>	<u>      </u>	<u>      </u>
Were all required documents present?	<u>X</u>	<u>      </u>	<u>      </u>
Were requested detection limits met?	<u>      </u>	<u>?</u>	<u>      </u>

Remark: Requested reporting limits not known to reviewer and the laboratory did not include MDLs on their reporting forms. Laboratory did use reduced sample volumes and dilutions for some samples.

**2. Holding Times:**

	Yes	N/A	No
VOA/BNA/PEST prepared within 14 days of sampling (7 days for VOA aromatics in non-preserved samples)?	<u>X</u>	<u>      </u>	<u>      </u>
PCDD/PCDF extracted within 30 days of sampling?	<u>      </u>	<u>X</u>	<u>      </u>
Extracts analyzed within 40 days of extraction?	<u>      </u>	<u>X</u>	<u>      </u>
Were all samples/extracts properly preserved?	<u>X</u>	<u>      </u>	<u>      </u>
<b>For TCLP:</b> Were RCRA TCLP holding times met?	<u>      </u>	<u>X</u>	<u>      </u>

Remark:

**3. GC/MS Tuning:**

	Yes	N/A	No
Were PFK/DFTPP/BFB criteria met?	<u>X</u>	<u>      </u>	<u>      </u>
<b>Pesticides:</b> Were standards run in proper sequence?	<u>      </u>	<u>X</u>	<u>      </u>
Combined DDT/Endrin Breakdown acceptable?	<u>      </u>	<u>X</u>	<u>      </u>
Retention time windows defined?	<u>      </u>	<u>X</u>	<u>      </u>

Remark:



## Project DG-0728

### 4.1 Initial Calibration:

	Yes	N/A	No
Were %RSDs acceptable?	X		
Were RRFs acceptable?		X	
Was S/N acceptable?		X	
Were PCDD/PCDF ion ratios acceptable?		X	

Remark: Initial calibration satisfied TO15 criteria.

### 4.2 Continuing Calibration:

	Yes	N/A	No
Were %RSDs acceptable?	X		
Were RRFs acceptable?		X	
Were PEST cont. calib. factors met?		X	
Was PCDD/PCDF S/N acceptable?		X	
Were PCDD/PCDF ion ratios acceptable?		X	

Remark: Continuing calibration satisfied TO15 criteria.

### 5. Spikes:

	Yes	N/A	No
Was a method spike analysis performed?	X		
Were matrix spike/ms. duplicate analyses performed?			X
Were acceptable recoveries obtained?	X		
Was acceptable precision obtained?		X	

Remark: Acceptable recoveries obtained for LCS. No measure of laboratory precision available. Acceptable precision was demonstrated for two pairs of what appeared to be field duplicates.

### 6. Blanks:

	Yes	N/A	No
Were blank analyses performed?	X		
Were any contaminants noted?	X		
If yes, were blank rules applied to the data?	X		

Remark: Areas in canister certification check similar to or not >5X sample areas for the same canister for a few analytes in a couple of samples.



<b>7. Performance Evaluation Sample:</b>	Yes	N/A	No
Was a P.E. Sample analyzed with the samples?	_____	_____	X
If yes, were acceptable results obtained?	_____	X	_____
Remark: No PES submitted.			
<b>8. Internal Standard / PCDD/PCDF Recovery Standards:</b>	Yes	N/A	No
Were peak areas acceptable?	X	_____	_____
Remark:			
<b>9. Surrogates / PCDD/PCDF Internal Standards:</b>	Yes	N/A	No
Were peak areas acceptable?	X	_____	_____
Remark:			
<b>10. Compound Identification / Quantification:</b>	Yes	N/A	No
Were all positive results confirmed?	X	_____	_____
Was supporting documentation included?	X	_____	_____
Was a check of the calculations performed?	X	_____	_____
If yes, were results acceptable?	X	_____	_____
PCDD/PCDF ion ratios acceptable?	_____	X	_____
Remark:			
<b>11. Tentatively Identified Compounds?</b>	Yes	N/A	No
Were TICs requested for these analyses?	_____	X	_____
If yes, were results provided?	_____	X	_____
Remark: TICs were not reported.			



## Project DG-0728

### III. Data Summary

Based on a review of the data provided, the following is a table summarizing the data qualifiers used by Region 4 for this report.

Recommended Data Qualifiers					
Case	NA	Project Number:	DG-0728	ELEMENT Sample ID. Nos	NA
Site	Smokey Mountain Smelters, Knoxville, TN			Date: 09/08/14	
Sample	Analyte(s)	Laboratory Report/ Qualifier		ESAT Suggested	
SMSSV AMBIENT	Trichloroethene; 1,1,2-trichloro-1,2,2-trifluoroethane	none		U,B-4 (canister possible source of result)	
SMSSV11-11	toluene	none		U,B-4 (canister possible source of result)	



September 18, 2014

Ms. Denise Goddard  
United States Environmental Protection Agency  
Science and Ecosystem Support Division  
980 College Station Road  
Athens, GA 30605-2720

Subject: Data Review and Validation  
Site Name: Smokey Mountain Smelters, Knoxville, TN  
Project No.: DG-0730 and DG-091714  
ELEMENT Sample ID. Nos: NA  
Inorganic Analysis: TestAmerica Laboratories, Inc., Savannah, Ga  
Date(s) Sampled: 6/24/14 – 6/26/14  
VTSR Date: 6/27/14  
Date Received from Lab:  
TDF No.: 14T0744 and 14T0895

Dear Ms. Goddard:

The ESAT Work Team has reviewed the above-captioned data package consisting of adequate deliverables to document EPA Methods 5310B for TOC; 7196A for hexavalent chromium; 2320B for alkalinity; E350.1 for ammonia; E365.1 for orthophosphate; 4500 for sulfide; E300.0 for nitrate, nitrite, fluoride, chloride, and sulfate; and 2540C for total dissolved solids (TDS) for 28 water samples according to EPA guidelines. This package presents acceptable technical performance and generally met the standard for quality required by Region 4 except as detailed below.

Dilutions for nitrate and nitrite were performed on select samples which resulted in elevated reporting and detection limits.

Examination of laboratory blank samples revealed apparent low-level contamination with several analytes. Reported detection limits were adjusted as high as ten times the blank levels to discount possible false positives due to contamination in laboratory blanks.

A Stage 4 validation consisting of manual review was performed on the inorganic samples submitted for this case.

Further details are provided in the attached review summary form. Please feel free to contact this office if we can be of further service.

Very truly yours,



Sue Jones  
Chemist  
Alion Science and Technology  
ESAT Contractor, Region 4 EPA



# **Inorganic Data Quality Assessment Record (DQAR)**

<b>Review Date:</b>	9/18/14	<b>Analyses:</b>	TOC, NO <sub>3</sub> , NO <sub>2</sub> , PO <sub>4</sub> , SO <sub>4</sub> , F, Cl, NH <sub>4</sub> , Sulfide, Alk., TDS, Cr <sup>6+</sup>	<b>Matrix:</b>	Water	<b>Project #:</b>	DG-0730 & DG-091714
<b>SDG /Lab File:</b>	680-102655, 680-102773, 680-102616, 680-102707						
<b>Laboratory</b>	TestAmerica Laboratories, Inc.						
<b>Site Name:</b>	Smokey Mountain Smelters, Knoxville, TN						
<b>Check One:</b>	EPA	ESAT	CLP	Other (specify)	Non-CLP (RAS)		

Signatures: SJ

Reviewer

Review Codes: M- Metals, O- Others

## **Sample Numbers:**

<b>Water:</b>		<b>Soil/Sediment:</b>	
SMSMW902A	SMSSW05	SMSMW04A	
SMSSWGW13	SMSSW20		
SMSMW10B	SMSMW02A	SMSMW08A	
SMSMW11A	SMSSW10	SMSMW01A	
SMSSW13	SMSSW09	SMSMW13B	
SMSSW14	SMSSW09 Spring	SMSMW03B	
SMSSW01	SMSSW11		
SMSSW08 Spring	SMSSW08		
SMSSW04	SMSSW94		
SMSMW07A	SMSMW12A		
SMSMW12B	SMSMW07B		
SMSMW11B			

## **I. SUMMARY OF PROBLEMS AND COMMENTS:**

A summary of deficiencies noted for the methods used to generate data for this project is presented below. Please refer to the Data Quality Assessment Record (DQAR) for each data file and the data flag summary table at the end of this review document. For the purposes of this review, the QC limits specified in the analytical method have been applied to the data. Data qualifier recommendations are made in accordance with the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (Functional Guidelines), and the Region 4 SOP, Data Validation Standard Operating Procedures for Contract Laboratory Program Routine Analytical Services (R4DVSOP).

### **Data Review Comments:**

<b>II. Data Quality Assessment (An explanation for any "no" answer must be provided)</b>				
		Yes	N/A	No
<b>1.</b>	<b>Summary</b>			
	Were all requested analyses performed?	O, M		
	Were all required QC checks performed?	O, M		
	Were all required documents present?	O, M		O
	Were requested detection limits met?	?		
Remark: Project required detection limits are unknown. Raw data missing for sulfide and TDS.				
<b>2.</b>	<b>Holding Times:(Holding times are not applicable for non-aqueous samples)</b>	Yes	N/A	No
	Were water samples properly preserved?	O, M		
	Were water holding time requirements met?	O, M		O



	Remark: Holding times missed for nitrate and nitrite in select samples. In some cases, holding time had expired upon receipt by laboratory.			
<b>3.</b>	Calibrations:	Yes	N/A	No
	A. Initial Calibration:			
	Were acceptable correlation coefficients obtained?	O, M		
	Were acceptable % Recoveries for analytes obtained?	O, M		
	B. Continuing Calibration			
	Were acceptable % Recoveries for analytes obtained?	O, M		
	Remark: Evaluation was performed according to the laboratory calibration limits for these non-CLP analytes which are outside of the +/- 10% customarily used for metals evaluation.			
<b>4.</b>	Blanks:	Yes	N/A	No
	Were any contaminants noted in the blanks?	O		M
	If yes, were blank rules applied to the data?	O	M	
	Remark: NH <sub>3</sub> and PO <sub>4</sub> were found in laboratory blanks. 10X rule applied.			
<b>5.</b>	ICP Interference Check Sample:	Yes	N/A	No
	Were results within 20% of the true value?		O, M	
	Were False positives Reported?		O, M	
	Were False negatives reported?		O, M	
	Remark:			
<b>6.</b>	Matrix spikes:	Yes	N/A	No
	Was a matrix spike analysis performed?	O, M		O
	Were samples spiked at appropriate levels?	O, M		O
	Were matrix spike/matrix spike duplicate analyses performed?	O, M		O
	Were acceptable recoveries obtained?	O, M		O
	Was acceptable precision obtained?	O, M		O
	Remark: MS/MSD analysis performed for Cr <sup>+6</sup> , anions, ammonia, TOC, and orthophosphate. LCS/LCSD recoveries and RPDs were used for accuracy and precision information for remaining parameters. Recovery was high in the MS/MSD for ammonia and nitrate. Nitrite recovery was low in the MS/MSD. Only samples that were spiked were qualified.			
<b>7.</b>	Matrix duplicate analysis:	Yes	N/A	No
	Was a matrix duplicate analysis performed?	O		O, M
	Was duplicate precision in control?	O	O, M	
	Remark: Duplicate analysis performed for alkalinity, TDS, NH <sub>3</sub> , oPO <sub>4</sub> , and sulfide. LCS/LCSD and/or MS/MSD recoveries and RPDs were used for accuracy and precision information for all other parameters.			
<b>8.</b>	Performance Evaluation Sample (PES):	Yes	N/A	No
	Was a PES analyzed with the samples?			O, M
	If yes, were acceptable results obtained?		O, M	
	Remark:			
<b>9.</b>	Method Standard / Laboratory Control Sample:	Yes	N/A	No
	Were acceptable recoveries obtained?	O, M		



	Was acceptable precision obtained?		O, M	
	Remark:			
10.	ICP Serial Dilution Sample:		Yes	N/A
	Was ICP serial dilution analysis performed?			O, M
	Were diluted results within 10% of undiluted sample result?			O, M
	Remark:			
11.	Completeness:		Yes	N/A
	Were all requested analyses performed?		O, M	
	Were all required documents present? If yes, were results provided?		O, M	O
	Were results of calculation checks acceptable?		O, M	
	Remark: Raw data not provided for TDS and sulfide.			



## Additional Comments:

### III. Data Qualifiers Summary

Based on a review of the quality control information, the following is a table summarizing the data qualifiers used by Region 4 for this data review report.

Recommended Data Qualifiers					
Case:	NA	Project Number:	DG-0730 & DG-091714	ELEMENT Sample ID Nos.:	NA
Site:	Smokey Mountain Smelters, Knoxville, TN			Date:	9/18/14
Affected Samples	Analytes	Recommended Qualifiers		Reason	
SMSMW10B	Ammonia	J, QM-2		Recovery of MS/MSD above acceptance limits.	
SMSMW11A	Nitrate	J, QM-2		Recovery of MS/MSD above acceptance limits.	
SMSMW02A	Nitrite	J, QM-1		Recovery of MS/MSD below acceptance limits.	
SMSSWG13, SMSMW04A, SMSSW08 Spring, SMSSW08, SMSSW04, SMSSW94, SMSMW07A	Ortho-phosphate	J, Q-2		Concentration <RL and >MDL	
SMSSW20, SMSSW01, SMSSW11, SMSMW12A, SMSMW12B	Fluoride	J, Q-2		Concentration <RL and >MDL	
SMSSW13, SMSSW09, SMSSW01	Nitrate	J, H-4		Holding time expired prior to receipt by laboratory	
SMSSW13, SMSSW09, SMSSW14, SMSSW09 Spring, SMSSW01, SMSSW11, SMSSW08 Spring, SMSSW08, SMSMW12B, SMSMW13B	Ammonia	U, B-4		Sample conc. < 10X blank value	
SMSSW13, SMSSW09, SMSSW01	Nitrite	J, H-4		Holding time expired prior to receipt by laboratory	
SMSSW09, SMSSW01, SMSSW08 Spring, SMSSW08	Total Organic Carbon	J, Q-2		Concentration <RL and >MDL	
SMSSW09 Spring	Nitrate	J, H-6		Reanalysis not within holding time.	
SMSMW08A	Nitrite	J, H-1		Holding time exceeded	



SMS site  
Knoxville, TN

Fish Sample Attribute Form

Site ID:

Date:

Field Sample ID:

Site  Subsite  Matrix ID  QC Type  Date

SMSFTB01

1230PM

Program Code:

GPS:

Yes

☐

No

☐

Total Weight (g):

Fish #1

LM Bass Fish species  
365 Fish length (total) (mm)  
500 Fish weight (g)

Comments: Fillet weight: ~~45.0g~~  
~~inorganics~~ Total = 172.9g  
~~Fillet weight inorganics: 77.9g~~

Fish #2

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #3

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #4

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #5

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Form Completed By:

JK

Date:

5/5/11



SMS site  
Knoxville, TN

Fish Sample Attribute Form

Site ID:

Date:

Field Sample ID:

Site  - Subsite  - Matrix ID  - QC Type

SMS FTB01R

Date

Program Code:

GPS:

Yes

☐

No

☐

Total Weight (g):

Note: egg mass present 2:15 PM

Fish #1

LB Bass Fish species  
415 Fish length (total) (mm)  
1100 Fish weight (g)

Comments:

Fillet wt. : 318g

Fish #2

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #3

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #4

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #5

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Form Completed By:

JK

Date:

5/5/11



SMS site  
Knoxville, TN

Fish Sample Attribute Form

Site ID:

Date:

Field Sample ID:

Site  Subsite  Matrix ID  QC Type  Date

SMS FTB02

1 PM

Program Code:

GPS:

Yes

☐

No

☐

Total Weight (g):

Fish #1

LM Bass Fish species  
445 Fish length (total) (mm)  
1200 Fish weight (g)

Comments:

Fillet wt. inorganic: ~~249.2~~  
Fillet wt. organic: ~~191.4~~  
440.6

Fish #2

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #3

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #4

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #5

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Form Completed By:

JK

Date:

5/5/11



### Fish Sample Attribute Form

--	--	--

1	1	0	5	0	9
---	---	---	---	---	---

Site	Subsite	Matrix ID	QC Type	Date
				11/05/05

230pm

0	0	0	1
---	---	---	---

**GPS:** Yes ☐ No ☐

**Total Weight (g):**

LM Bagg	Fish species
355	Fish length (total) (mm)
650	Fish weight (g)

**Comments:**

Fillet wt. 194.0

### Fish #2

	<b>Fish species</b>
	<b>Fish length (total) (mm)</b>
	<b>Fish weight (g)</b>

**Comments:**

### Fish #3

	<b>Fish species</b>
	<b>Fish length (total) (mm)</b>
	<b>Fish weight (g)</b>

**Comments:****Fish #4**

	<b>Fish species</b>
	<b>Fish length (total) (mm)</b>
	<b>Fish weight (g)</b>

**Comments:**

### Fish #5

	Fish species
	Fish length (total) (mm)
	Fish weight (g)

**Comments:**

**Form Completed By:**

JK

**Date:**

5/5/11



SMS site  
Knoxville, Tn

Fish Sample Attribute Form

Site ID:

Date:

Field Sample ID:

Site  Subsite  Matrix ID  QC Type  Date

SMS FTB 03

130pm

Program Code:

GPS: Yes ☐ No ☐

Total Weight (g):

Note: egg mass present

Fish #1

LM Bass Fish species  
460 Fish length (total) (mm)  
1500 Fish weight (g)

Comments:

Fillet wt. ~~inorganic~~ 126.4  
Fillet wt. ~~organic~~ 468.3  
25.1

Fish #2

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #3

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #4

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #5

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Form Completed By:

JK

Date:

5/5/11



SMS Site  
Knoxville, TN

Fish Sample Attribute Form

Site ID:

Date:

Field Sample ID:

Site    Subsite   Matrix ID       QC Type   Date

Program Code:

GPS:

☐

No

☐

Total Weight (g):

Note: Egg mass present

Fish #1

LM Bass Fish species  
480 Fish length (total) (mm) 480  
1500 Fish weight (g)

Comments:

Fillet wt. ~~organic~~ : 506.8  
~~Fillet wt. ~~organic~~ : 257.1~~

Fish #2

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #3

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #4

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #5

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Form Completed By:

JK

Date:

5/5/11

Sample split for duplicate SMSFTB04D



SMS site  
Knoxville, Tn

Fish Sample Attribute Form

Site ID:

Date:

Field Sample ID:

Site  Subsite  Matrix ID  QC Type  Date

SMSFTB05

220PM

Program Code:

GPS: Yes ☐ No ☐

Total Weight (g):

Fish #1

LM Bass Fish species  
525 Fish length (total) (mm)  
2000 Fish weight (g)

Comments:

Fillet wt. : 631g

Fish #2

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #3

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #4

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #5

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Form Completed By:

JK

Date:

5/5/11



SMS Site  
Knoxville, TN

Fish Sample Attribute Form

Site ID:

Date:

Field Sample ID:

Site  - Subsite  - Matrix ID  - QC Type

SMS FTB06 240PM

Date

Program Code:

GPS: Yes ☐ No ☐

Total Weight (g):

Note: 1 egg mass present

Fish #1	
LM Bass	Comments: Fillet Wt.: 260.3
365	
750	
Fish species	
Fish length (total) (mm)	
Fish weight (g)	
Fish #2	
Fish species	Comments:
Fish length (total) (mm)	
Fish weight (g)	
Fish #3	
Fish species	Comments:
Fish length (total) (mm)	
Fish weight (g)	
Fish #4	
Fish species	Comments:
Fish length (total) (mm)	
Fish weight (g)	
Fish #5	
Fish species	Comments:
Fish length (total) (mm)	
Fish weight (g)	

Form Completed By:

JK

Date:

5/5/11



SMS site  
Knoxville, TN

whole body

# Fish Sample Attribute Form

Site ID:

Date:

Field Sample ID:

Site:  - Subsite:  - Matrix ID:  - QC Type:  - Date:

Program Code:

GPS: Yes ☐ No ☐

Total Weight (g):

## Fish #1

Bass, 11 Fish species  
192 Fish length (total) (mm)  
116.1 Fish weight (g)

Comments:

## Fish #2

Bass, 11 Fish species  
168 Fish length (total) (mm)  
69.1 Fish weight (g)

Comments:

## Fish #3

           Fish species  
           Fish length (total) (mm)  
           Fish weight (g)

Comments:

## Fish #4

           Fish species  
           Fish length (total) (mm)  
           Fish weight (g)

Comments:

## Fish #5

           Fish species  
           Fish length (total) (mm)  
           Fish weight (g)

Comments:

Form Completed By:

TU

Date:

5/5/11



SMS Site  
Knoxville, TN

whole body

Fish Sample Attribute Form

Site ID:

Date:

Field Sample ID:

Site  Subsite  Matrix ID  QC Type  Date

Program Code:

GPS: Yes

☐

No

☐

Total Weight (g):

Fish #1

Bluegill Fish species  
175 Fish length (total) (mm)  
97.1 Fish weight (g)

Comments: *Bluegill*

Fish #2

Bluegill Fish species  
182 Fish length (total) (mm)  
97.0 Fish weight (g)

Comments:

Fish #3

Bluegill Fish species  
159 Fish length (total) (mm)  
54.7 Fish weight (g)

Comments:

Fish #4

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #5

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Form Completed By:

*TW*

Date:

*5/5/11*



SMS Site

Knoxville, TN

Wholebody

## Fish Sample Attribute Form

Site ID:




Date:







Field Sample ID:

Site	Subsite	Matrix ID	QC Type	Date
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

SMSFTS02

Program Code:





GPS: Yes

☐

No

☐

Total Weight (g):

## Fish #1

Bluegill Fish species  
 195 Fish length (total) (mm)  
 128.1 Fish weight (g)

Comments:

## Fish #2

Bluegill Fish species  
 150 Fish length (total) (mm)  
 40 Fish weight (g)

Comments:

## Fish #3

Fish species  
 Fish length (total) (mm)  
 Fish weight (g)

Comments:

## Fish #4

Fish species  
 Fish length (total) (mm)  
 Fish weight (g)

Comments:

## Fish #5

Fish species  
 Fish length (total) (mm)  
 Fish weight (g)

Comments:

Form Completed By:

TW

Date:

5/5/11



SMS site  
Knoxville, TN

Walebury

# Fish Sample Attribute Form

Site ID:

--	--	--

Date:

1	1	0	5	0	5
---	---	---	---	---	---

Field Sample ID:

Site	Subsite	Matrix ID	QC Type	Date

SMSFIS #3

Program Code:

0	0	0	1
---	---	---	---

GPS: Yes

☐

No

☐

Total Weight (g):

## Fish #1

Breasil Fish species  
170 Fish length (total) (mm)  
83.0 Fish weight (g)

Comments:

## Fish #2

Breasil Fish species  
161 Fish length (total) (mm)  
63.6 Fish weight (g)

Comments:

## Fish #3

Breasil Fish species  
119 Fish length (total) (mm)  
29.4 Fish weight (g)

Comments:

## Fish #4

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

## Fish #5

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Form Completed By:

TL

Date:

5/5/11



SMS Site  
Knoxville, TN

Whole body

# Fish Sample Attribute Form

Site ID:

--	--	--

Date:

1	1	0	5	0	5
---	---	---	---	---	---

Field Sample ID:

Site	Subsite	Matrix ID	QC Type	Date

SMS FTS 02R

Program Code:

0	0	0	1
---	---	---	---

GPS: Yes ☐ No ☐

Total Weight (g): \_\_\_\_\_

Fish #1

Bass Fish species  
185 Fish length (total) (mm)  
97.3 Fish weight (g)

Comments:

Fish #2

Bass Fish species  
180 Fish length (total) (mm)  
93.6 Fish weight (g)

Comments:

Fish #3

Bass Fish species  
165 Fish length (total) (mm)  
71.4 Fish weight (g)

Comments:

Fish #4

\_\_\_\_ Fish species  
\_\_\_\_ Fish length (total) (mm)  
\_\_\_\_ Fish weight (g)

Comments:

Fish #5

\_\_\_\_ Fish species  
\_\_\_\_ Fish length (total) (mm)  
\_\_\_\_ Fish weight (g)

Comments:

Form Completed By:

TW

Date:

05/05/11



Whole body

## Site ID:

--	--	--

**Date:**

1	1	0	5	0	5
---	---	---	---	---	---

5m5FT 504

Date \_\_\_\_\_

[illegible]

0	0	0	1
---	---	---	---

**GPS:** Yes ☐ No ☐

**Total Weight (g):** \_\_\_\_\_

<i>Breasil</i>	Fish species
165	Fish length (total) (mm)
82.3	Fish weight (g)

**Comments:**

<u>Bluegill</u>	Fish species
<u>130</u>	Fish length (total) (mm)
<u>34.5</u>	Fish weight (g)

**Comments:**

Bluegill	Fish species
130	Fish length (total) (mm)
34.2	Fish weight (g)

**Comments:**

	<b>Fish species</b>
	<b>Fish length (total) (mm)</b>
	<b>Fish weight (g)</b>

**Comments:**

	Fish species
	Fish length (total) (mm)
	Fish weight (g)

**Comments:**

**Form Completed By:**

72a

**Date:**

$$\frac{5}{5} / \frac{5}{5} / 1$$



SMS Site  
Knoxville, TN

Wholebody

# Fish Sample Attribute Form

Site ID:

--	--	--

Date:

1	1	0	5	0	5
---	---	---	---	---	---

Field Sample ID:

Site	Subsite	Matrix ID	QC Type	Date

SMS FTS 65

Program Code:

0	0	0	1
---	---	---	---

GPS:

Yes

☐

No

☐

Total Weight (g):

Fish #1

Bluegill Fish species  
154 Fish length (total) (mm)  
74.3 Fish weight (g)

Comments:

Fish #2

Bluegill Fish species  
125 Fish length (total) (mm)  
35.6 Fish weight (g)

Comments:

Fish #3

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #4

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #5

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Form Completed By:

TU

Date:

5/5/11



SMS Site

Whole body

## Fish Sample Attribute Form

Site ID:

Date:

Field Sample ID:

Site	Subsite	Matrix ID	QC Type	Date
<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

SMS FTS #6

Program Code:

GPS:

Yes ☐No ☐

Total Weight (g):

## Fish #1

<u>Bass</u>	Fish species
<u>163</u>	Fish length (total) (mm)
<u>74.7</u>	Fish weight (g)

Comments:

## Fish #2

<u>Bass</u>	Fish species
<u>145</u>	Fish length (total) (mm)
<u>59.9</u>	Fish weight (g)

Comments:

## Fish #3

	Fish species
	Fish length (total) (mm)
	Fish weight (g)

Comments:

## Fish #4

	Fish species
	Fish length (total) (mm)
	Fish weight (g)

Comments:

## Fish #5

	Fish species
	Fish length (total) (mm)
	Fish weight (g)

Comments:

Form Completed By:

TL

Date:

5/5/11



SMS site  
Knoxville, TN

Fish Sample Attribute Form

Site ID:

Date:

Field Sample ID:

Site    - Subsite   - Matrix ID       - QC Type  - Date

SMS FTCØ1  
250pm

Program Code:

GPS: Yes ☐ No ☐

Total Weight (g):

Fish #1

Carp Fish species  
415 Fish length (total) (mm)  
900 Fish weight (g)

Comments:  
Fillet wt. 188.9g  
240.1  
74.0  
74.2  
188.9

Fish #2

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #3

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #4

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #5

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Form Completed By:

JK

Date:

5/5/11



153  
115  
768



SMS Site  
Knoxville, TN

Fish Sample Attribute Form

Site ID:

Date:

Field Sample ID:		SMS FTC02			
Site	Subsite	Matrix ID	QC Type	Date	
<span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span>	<span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span>	<span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span> <span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span> <span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span> <span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span> <span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span> <span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span> <span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span> <span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span>	<span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span>	<span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span> <span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span> <span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span> <span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span> <span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span> <span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span>	310pm
Program Code:					
<span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span> <span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span> <span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span> <span style="border: 1px solid black; display: inline-block; width: 20px; height: 20px;"></span>		GPS: Yes <input type="checkbox"/> No <input type="checkbox"/> Total Weight (g): _____			
Fish #1					
cavp 480 1500		Fish species Fish length (total) (mm) Fish weight (g)	Comments: Fillet wt. 259.8		
Fish #2					
		Fish species Fish length (total) (mm) Fish weight (g)	Comments:		
Fish #3					
		Fish species Fish length (total) (mm) Fish weight (g)	Comments:		
Fish #4					
		Fish species Fish length (total) (mm) Fish weight (g)	Comments:		
Fish #5					
		Fish species Fish length (total) (mm) Fish weight (g)	Comments:		

Form Completed By: JK Date: 5/5/11







5/5/1



SMS site  
Knoxville, TN

Fish Sample Attribute Form

Site ID:

Date:

Field Sample ID:

Site    Subsite   Matrix ID       QC Type   Date

SMS FTC04  
320pm

Program Code:

GPS:

Yes

☐

No

☐

Total Weight (g):

Fish #1

Carp Fish species  
430 Fish length (total) (mm)  
1100 Fish weight (g)

Comments:

Fillet wt: 193.7

Fish #2

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #3

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #4

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #5

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Form Completed By:

JK

Date:

5/5/11



SMS-site  
Knoxville, TN

Fish Sample Attribute Form

Site ID:

Date:

Field Sample ID:

Site    - Subsite   - Matrix ID       - QC Type   - Date

Program Code:

GPS:

Yes ☐

No ☐

Total Weight (g):

SMSFTC05

320pm

Fish #1

Carp Fish species  
510 Fish length (total) (mm)  
1800 Fish weight (g)

Comments:

Fillet wt. 238g  
rt. side

Fish #2

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #3

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #4

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Fish #5

Fish species  
Fish length (total) (mm)  
Fish weight (g)

Comments:

Form Completed By:

JK

Date:

5/5/11







*headwaters area*

### Stream Characterization Form

Reach ID: *SDSW01*

Investigators: *JK CJR*

Weather: *cloudy 60° 12pm*

Stream: *Fleming* Date: *5/4/11*

#### TYPE 1

- ☐ Well developed baseflow and bankfull channel
- ☐ Consistent floodplain features easily identified
- ☐ Predictable channel morphology
- ☐ One terrace apparent above active floodplain
- ☐ Floodplain covered by diverse vegetation
- ☐ Streambanks <= 45 degree

#### TYPE 2

- ☐ Headcuts
- ☐ Exposed cultural features (channel bottom)
- ☐ Sediment deposits absent or sparse
- ☐ Exposed bedrock (part of reach)
- ☐ Streambank slopes > 45 degree

#### TYPE 3

- ☒ Streambank sloughing
- ☒ Sloughed material eroding
- ☒ Streambank slopes > 60degree or vertical/undercut
- ☒ Accelerated bend migration
- ☒ Erosion on inside of bends
- ☒ Exposed cultural features (channel banks)
- ☒ Exposed bedrock (majority of reach)

#### TYPE 4

- ☐ Streambank aggrading
- ☐ Sloughed material not eroded
- ☐ Sloughed material colonized by vegetation
- ☐ Baseflow, bankfull and floodplain channel developing
- ☐ Predictable channel morphology developing
- ☐ Streambank slopes <= 45 degree

#### TYPE 5

- ☐ Well developed baseflow and bankfull channel
- ☐ Consistent floodplain features easily identified
- ☐ Two terraces apparent above active floodplain
- ☐ Predictable channel morphology
- ☐ Streambanks <= 45 degree

#### Notes

Assigned CEM Type  
Dominant Substrate

*III* 3

Representative of *100* % of total reach length  
1. *Clay* 2. Silt 3. Sand 4. Gravel 5. Cobble  
6. Boulder 7. Bedrock 8. Other (specify)

#### Comments

*Type 3  
alot of what see  
typ. for a Type 3  
noted above,  
esp. stream bank  
sloughing & erosion*

*sandy  
clay  
- area just d/s  
of headwaters*

*- clay bottom*





A SERVICE DISABLED VETERAN OWNED SMALL BUSINESS

looking p/s

Stream: Flownegan head  
waters

→ 32' edgechan





## In-Stream Characteristics Form

Reach ID: SDSW01

Date: 5/4/11 12pm

Investigators: JK CJR

Watershed: \_\_\_\_\_ Stream: Freemigan

### A. Water Appearance

- ☐ 1. Clear ☐ 6. Dark Brown  
☐ 2. Milky ☐ 7. Oily Sheer  
☐ 3. Foamy ☐ 8. Reddish  
☒ 4. Turbid slightly ☐ 9. Greenish  
☐ 5. Light Brown Other \_\_\_\_\_

34 ntu

### B. Water Odor

- ☐ 1. Sewage ☐ 4. Rotten Eggs  
☐ 2. Chlorine ☒ 5. None  
☐ 3. Fishy  
Other \_\_\_\_\_

### C. Sediment Odor

- ☐ 1. Sewage ☐ 4. Rotten Eggs  
☐ 2. Chlorine ☐ 5. Oxidation  
☐ 3. Petroleum ☒ None slight  
Other sulfur  
odor

### D. Fish

- ☒ None  
☐ Small (1-2 in.)  
☐ Medium (3-6 in.)  
☐ Large (7 in. & above)

but did note  
sm. salamanders  
a few of  
them

### E. Aquatic Plants

- Percent Area 10% ☐ 10 - 30 %  
☒ 1 - 10 % ☐ 30 - 50 %  
☐ > 50 %  
If present, are they ☒ Attached ☐ Free-flowing  
Where are they located?  
☐ Stream margin ☒ Pools ☐ Near riffles  
alittle in pools

### F. Algae

- Algae "slime" coating ☒ None ☐ Light ☐ Heavy  
Color: ☐ Brown ☐ Green Other \_\_\_\_\_  
Filamentous Algae: ☒ None ☐ Green ☐ Orange  
☐ Brown Other \_\_\_\_\_  
Floating Algae: ☒ None ☐ Brown ☐ Green Other \_\_\_\_\_

### G. Sediment Appearance/Classification

Size: \_\_\_\_\_  
Material Type: \_\_\_\_\_  
Substrate Deposition: \_\_\_\_\_  
Bottom Substrate/Available Cover: \_\_\_\_\_  
Channel Alteration: \_\_\_\_\_  
Channel Sinuosity: \_\_\_\_\_  
Erosion: yes  
Bank Stability (LB & RB): Both eroding  
Vegetated Buffer Zone Width: < 5ft  
100%

#### USCS Classification

- ☐ GW well graded gravel, fine to coarse gravel  
☐ GP poorly graded gravel  
☐ GM silty gravel  
☐ GC clayey gravel  
☐ SW well graded sand, fine to coarse sand  
☐ SP poorly-graded sand  
☐ SM silty sand  
☒ SC clayey sand  
☐ ML silt  
☐ CL clay  
☐ OL organic silt, organic clay  
☐ MH silt of high plasticity, elastic silt  
☐ CH clay of high plasticity, fat clay  
☐ OH organic clay, organic silt  
☐ Pt peat

#### Notes

stream running  
alittle turbid after  
ran previous day  
but up in headwater  
area, not much Q

Buffer seriously  
lacking



# Wetland Sketch

Note: Identify trees, shrubs, vegetation, grasses within stream bank and wetland areas

NA

## Notes:

Distances are measured from left bank looking downstream.

Use feature abbreviations from the following list, as shown in figure (WS refers to baseflow water surface):

TOLB - Top of left bank

BKP - Breakpoint

LCB - Left channel Bottom

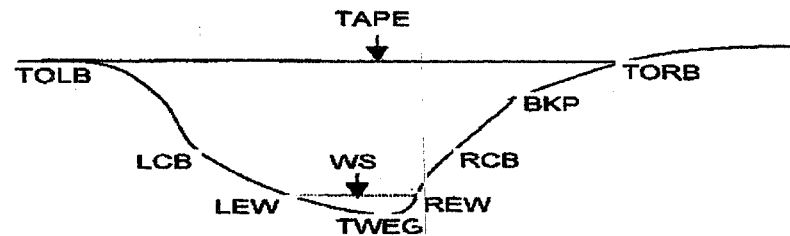
LEW - Left edge of water

TWEG - Thalweg

REW - Right edge of water

RCB - Right channel bottom

TORB - Top of right bank





Sampling Location  
Ø1

ADDITIONAL NOTES

with

minimal Trees noted along banks

honey suckle  
- ~~viburnum~~ shrub, Box elder,

1 or 2 sycamores, 1 or 2 hop horn  
beem

ash, or Black gum  
a few  
large 1.5' 2' dia.

little if any  
stream buffer

Flow

very minimal Q,  $< 0.5 \text{ ft/s}$

wetted flow channel 6' x .25' = 1.5 ft<sup>2</sup>  
perimeter

Q = 0.5 cfs Flow 15-1 max cfs

- not alot to note at this location, min. # trees, min. Q in stream, no <sup>stream</sup> buffer, creek is eroding esp. after heavy rain previous day.



### Stream Characterization Form

Reach ID: SDSW 03

Investigators: JK CSR

Weather: cloudy 1020

Stream: Fleming Date: 5/4/11

#### TYPE 1

- ☐ Well developed baseflow and bankfull channel
- ☐ Consistent floodplain features easily identified
- ☐ Predictable channel morphology
- ☐ One terrace apparent above active floodplain
- ☐ Floodplain covered by diverse vegetation
- ☐ Streambanks <= 45 degree

#### TYPE 2

- ☐ Headcuts
- ☐ Exposed cultural features (channel bottom)
- ☐ Sediment deposits absent or sparse
- ☐ Exposed bedrock (part of reach)
- ☐ Streambank slopes > 45 degree

#### TYPE 3

- ☐ Streambank sloughing
- ☐ Sloughed material eroding
- ☐ Streambank slopes > 60degree or vertical/undercut
- ☒ Accelerated bend migration
- ☐ Erosion on inside of bends
- ☐ Exposed cultural features (channel banks)
- ☐ Exposed bedrock (majority of reach)

#### TYPE 4

- ☒ Streambank aggrading
- ☒ Sloughed material not eroded
- ☒ Sloughed material colonized by vegetation
- ☒ Baseflow, bankfull and floodplain channel developing
- ☒ Predictable channel morphology developing
- ☐ Streambank slopes <= 45 degree

*+terraces in some spots*

#### TYPE 5

- ☐ Well developed baseflow and bankfull channel
- ☐ Consistent floodplain features easily identified
- ☐ Two terraces apparent above active floodplain
- ☐ Predictable channel morphology
- ☐ Streambanks <= 45 degree

#### Notes

*D/S of site, hike thru woods!*

Assigned CEM Type 4  
Dominant Substrate 223

Representative of 100 % of total reach length  
1. Clay 2. Silt 3. Sand 4. Gravel 5. Cobble  
6. Boulder 7. Bedrock 8. Other (specify)

#### Comments

*Type 4, but w/ alot of ~~sed~~ sediment being washed down from u/s degrading stream reach, parts of this stream were very stable in this location before disturbance u/s, bank stable & vegetated w/ moss*

*could note 2 terraces in rt. bank at some places*

*Type*

*So, this reach of stream was stable 4-5, before disturbance u/s causing > Q & sedimentation D/S*





→ see sketch

Stream: (2) next pgs.

Date: \_\_\_\_\_ Watershed: \_\_\_\_\_

Stream: \_\_\_\_\_

[illegible]



## In-Stream Characteristics Form

Reach ID: SD9W03

Investigators: JK CTR

Date: 5/4/11 1020

Watershed: \_\_\_\_\_ Stream: Fleannigan

### A. Water Appearance

- ☐ 1. Clear ☐ 6. Dark Brown  
☐ 2. Milky ☐ 7. Oily Sheer  
☐ 3. Foamy ☐ 8. Reddish  
☒ 4. Turbid Slightly ☐ 9. Greenish  
☐ 5. Light Brown Other \_\_\_\_\_

### B. Water Odor

- ☐ 1. Sewage ☐ 4. Rotten Eggs  
☐ 2. Chlorine ☒ 5. None  
☐ 3. Fishy  
Other \_\_\_\_\_

### C. Sediment Odor

- ☐ 1. Sewage ☐ 4. Rotten Eggs  
☐ 2. Chlorine ☐ 5. Oxidation  
☐ 3. Petroleum ☒ 6. None  
Other \_\_\_\_\_

### D. Fish

- ☒ None  
☐ Small (1-2 in.)  
☐ Medium (3-6 in.)  
☐ Large (7 in. & above)

### E. Aquatic Plants

- Percent Area: ☒ 0% ☐ 10 - 30 %  
☐ 1 - 10 % ☐ 30 - 50 %  
☐ > 50 %  
If present, are they: ☐ Attached ☐ Free-flowing  
Where are they located?  
☐ Stream margin ☐ Pools ☐ Near riffles

### F. Algae

- Algae "slime" coating: ☒ None ☐ Light ☐ Heavy  
Color: ☐ Brown ☐ Green Other \_\_\_\_\_  
Filamentous Algae: ☒ None ☐ Green ☐ Orange  
☐ Brown Other \_\_\_\_\_  
Floating Algae:  
☒ None ☐ Brown ☐ Green Other \_\_\_\_\_

### G. Sediment Appearance/Classification

Size: \_\_\_\_\_  
Material Type: \_\_\_\_\_  
Substrate Deposition: \_\_\_\_\_  
Bottom Substrate/Available Cover: \_\_\_\_\_  
Channel Alteration: \_\_\_\_\_  
Channel Sinuosity: \_\_\_\_\_  
Erosion: sedimentation from y/s  
Bank Stability (LB & RB): somewhat  
Vegetated Buffer Zone Width: \_\_\_\_\_

#### USCS Classification

- ☐ GW well graded gravel, fine to coarse gravel  
☐ GP poorly graded gravel  
☐ GM silty gravel  
☐ GC clayey gravel  
☐ SW well graded sand, fine to coarse sand  
☐ SP poorly-graded sand  
☐ SM silty sand  
☐ SC clayey sand  
☒ ML silt sap sandy silt  
☐ CL clay  
☐ OL organic silt, organic clay  
☐ MH silt of high plasticity, elastic silt  
☐ CH clay of high plasticity, fat clay  
☐ OH organic clay, organic silt  
☐ Pt peat

#### Notes

very silty in  
sampling area

left Buffer looking d/s  
is dump old vehicles

very just d/s in riffle

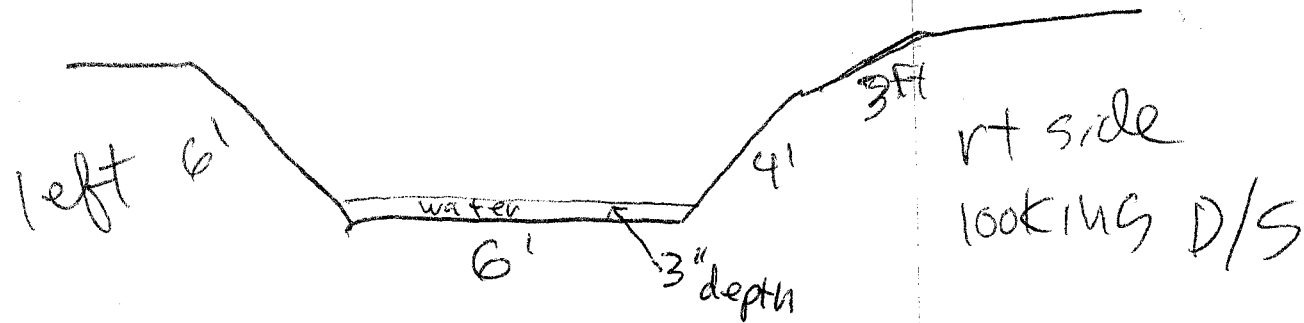
sap sandy silt in  
sampling  
area



# ~~Wetland~~ Sketch

NA wetland

Note: Identify trees, shrubs, vegetation, grasses within stream bank and wetland areas



## Notes:

Distances are measured from left bank looking downstream.

Use feature abbreviations from the following list, as shown in figure (WS refers to baseflow water surface):

TOLB - Top of left bank

BKP - Breakpoint

LCB - Left channel Bottom

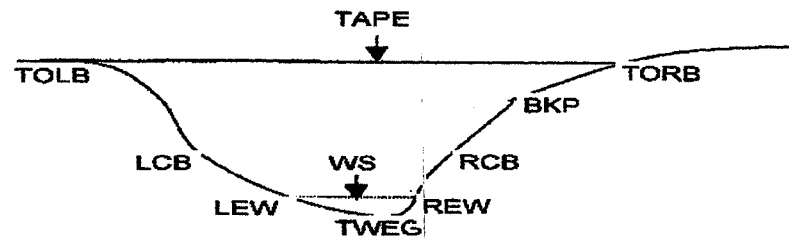
LEW - Left edge of water

TWEG - Thalweg

REW - Right edge of water

RCB - Right channel bottom

TORB - Top of right bank



Stream X-sec.

Sampling loc. #3



Sampling Location  
03

ADDITIONAL NOTES

Trees, More of same

honey suckle but noted Tulip poplar, Box Elder  
shrub all ~~viburnum?~~ Sycamore  
alot in understory / shrub Banks evoked in some  
dominant tree spots but w/veg.  
lost

- part of stream well stabilized  
but being impacted by all sed-  
iment being washed down from  
site u/s!

almost rectangular channel

velocity 0.5-1 ft/s

Flow area

$$3' \times .25' = .75 \times 1 = 0.75 \text{ ft}^2 \\ \text{width depth} \sim 1 \text{ cfs}$$

again, Flow  
meter suspect  
in low Q water





### Stream Characterization Form

Reach ID: SDSW 04

Investigators: JK CJR

Weather: cloudy 930

Stream: Hennigan Date: 5/4

#### TYPE 1

- ☐ Well developed baseflow and bankfull channel
- ☐ Consistent floodplain features easily identified
- ☐ Predictable channel morphology
- ☐ One terrace apparent above active floodplain
- ☐ Floodplain covered by diverse vegetation
- ☐ Streambanks <= 45 degree

#### TYPE 2

- ☐ Headcuts
- ☐ Exposed cultural features (channel bottom)
- ☐ Sediment deposits absent or sparse
- ☐ Exposed bedrock (part of reach)
- ☐ Streambank slopes > 45 degree

#### TYPE 3

- ☒ Streambank sloughing
- ☒ Sloughed material eroding
- ☒ Streambank slopes > 60 degree or vertical/undercut
- ☒ Accelerated bend migration
- ☒ Erosion on inside of bends
- ☒ Exposed cultural features (channel banks)
- ☒ Exposed bedrock (majority of reach)

#### TYPE 4

- ☐ Streambank aggrading
- ☐ Sloughed material not eroded
- ☐ Sloughed material colonized by vegetation
- ☐ Baseflow, bankfull and floodplain channel developing
- ☐ Predictable channel morphology developing
- ☐ Streambank slopes <= 45 degree

#### TYPE 5

- ☐ Well developed baseflow and bankfull channel
- ☐ Consistent floodplain features easily identified
- ☐ Two terraces apparent above active floodplain
- ☐ Predictable channel morphology
- ☐ Streambanks <= 45 degree

#### Notes

active bank erosion evident  
no veg. on banks

Assigned CEM Type

III 3

Dominant Substrate

silt

Representative of 90 % of total reach length

1. Clay 2. Silt 3. Sand 4. Gravel 5. Cobble  
6. Boulder 7. Bedrock 8. Other (specify)

Comments

There is a good gravelly riffle  
d/s of pool @ culvert, pool created  
by rug that dammed up stream  
d/s of culvert outfall

→ soils were  
sampling location below it in  
riffle



### Cross Section Data

Reach ID: 04 Investigators: JK CJA

Date: 5/4/11 Watershed: \_\_\_\_\_ Stream: Flenburg  
inches

X-Section	Distance from Left Bank (ft)	Depth (ft)	Feature Abbreviation
TOB	0	6	
	1' .25	3"	Bank
	2' .12	14"	↓
	3' .22	26"	↓
edge creek	4' .39	46.5	TWEG
	5' .36	43	↓
	6' .35	41.5	↓
edge creek	7' .35	41	↓
	8' .23	28	
	9' .21	24.5	
	10' .20	24	
	11' .21	21.5	
	12' .16	19.5	
	13' .15	17.5	Bank
	14' .12	14	Bank
TOB	15'	0	
	<del>16'</del>		

Note  
Flow meter  
suspect in  
Low Q water

Stream w/flow 22" x 3" width Depth area  $\approx 15 \text{ ft}^2$

QF Velocity 0.5 ft/s

$$Q = .5 \times .5 = 0.25 \text{ ft}^3/\text{s}$$

minimal  
Flow  
1 cfs max





### In-Stream Characteristics Form

Reach ID: SDSW 04

Investigators: JK CTR

Date: 5/4/11, 930

Watershed: \_\_\_\_\_ Stream: Fleming

#### A. Water Appearance

- ☐ 1. Clear ☐ 6. Dark Brown  
☐ 2. Milky ☐ 7. Oily Sheer  
☐ 3. Foamy ☐ 8. Reddish  
☒ 4. Turbid ☐ 9. Greenish  
☐ 5. Light Brown Other \_\_\_\_\_

→ 41.3 NTUS

#### B. Water Odor

- ☐ 1. Sewage ☐ 4. Rotten Eggs  
☐ 2. Chlorine ☒ 5. None  
☐ 3. Fishy  
Other \_\_\_\_\_

#### C. Sediment Odor

- ☐ 1. Sewage ☐ 4. Rotten Eggs  
☐ 2. Chlorine ☐ 5. Oxidation  
☐ 3. Petroleum ☒ 6. None  
Other \_\_\_\_\_

#### D. Fish

- ☒ None  
☐ Small (1-2 in.)  
☐ Medium (3-6 in.)  
☐ Large (7 in. & above)

#### E. Aquatic Plants

- Percent Area: ☒ 0% ☐ 10 - 30 %  
☐ 1 - 10 % ☐ 30 - 50 %  
☐ > 50 %  
If present, are they ☐ Attached ☐ Free-flowing  
Where are they located?  
☐ Stream margin ☐ Pools ☐ Near riffles

#### F. Algae

- Algae "slime" coating: ☒ None ☐ Light ☐ Heavy  
Color: ☐ Brown ☐ Green Other \_\_\_\_\_  
Filamentous Algae: ☒ None ☐ Green ☐ Orange  
☐ Brown Other \_\_\_\_\_  
Floating Algae:  
☒ None ☐ Brown ☐ Green Other \_\_\_\_\_

#### G. Sediment Appearance/Classification

Size: \_\_\_\_\_  
Material Type: \_\_\_\_\_  
Substrate Deposition: \_\_\_\_\_  
Bottom Substrate/Available Cover: \_\_\_\_\_  
Channel Alteration: \_\_\_\_\_  
Channel Sinuosity: \_\_\_\_\_  
Erosion: yes @ bank  
Bank Stability (LB & RB): Bad  
Vegetated Buffer Zone Width: > 20'

##### USCS Classification

- ☐ GW well graded gravel, fine to coarse gravel  
☐ GP poorly graded gravel  
☐ GM silty gravel  
☐ GC clayey gravel  
☒ SW well graded sand, fine to coarse sand  
☐ SP poorly-graded sand  
☐ SM silty sand  
☐ SC clayey sand  
☐ ML silt  
☐ CL clay  
☐ OL organic silt, organic clay  
☐ MH silt of high plasticity, elastic silt  
☐ CH clay of high plasticity, fat clay  
☐ OH organic clay, organic silt  
☐ Pt peat

#### Notes

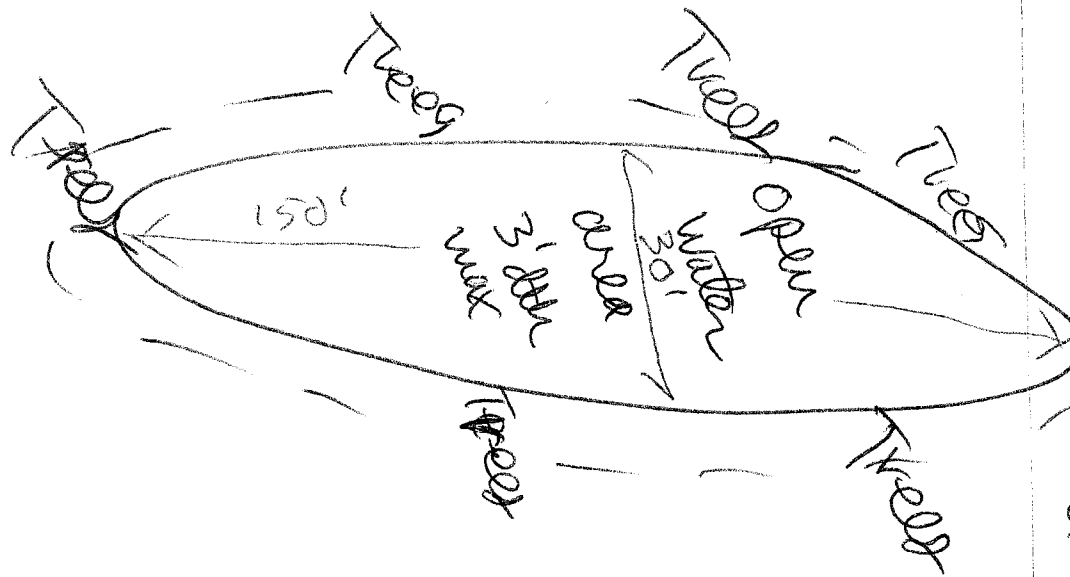
good veg. buffer  
Both sides  
stream dilo  
but w/ some  
siltation

at sampling  
location



# Wetland Sketch

Note: Identify trees, shrubs, vegetation, grasses within stream bank and wetland areas



W/Trees noted  
next pg. 000  
around

See photo

Sampling Pt wetland  
Location

## Notes:

Distances are measured from left bank looking downstream.

Use feature abbreviations from the following list, as shown in figure (WS refers to baseflow water surface):

TOLB - Top of left bank

BKP - Breakpoint

LCB - Left channel Bottom

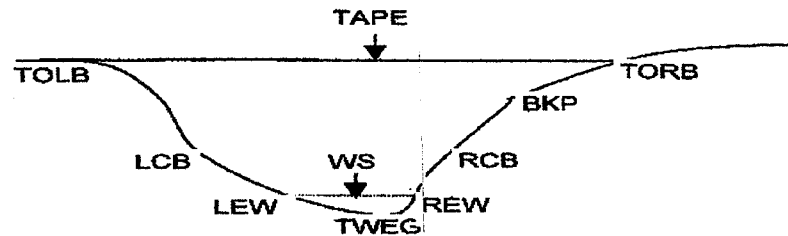
LEW - Left edge of water

TWEG - Thalweg

REW - Right edge of water

RCB - Right channel bottom

TORB - Top of right bank





Sampling  
Location 04

ADDITIONAL NOTES

Trees along creek  
noted Sycamores, ~~1-2 poplars~~ <sup>common understory</sup>, hop horn beam  
1-2 poplars, Red Maples, Box Elder

alot  
Honey Suckle  
Tree real  
common in under  
story

same sps.  
as always  
at other site

Trees around wetland are bet. Creek & Tracks  
alot sycamore, <sup>alot</sup> Red Maple, Sw Gum, Ashes, hop horn beam  
area ~ 30' x 150' area 2-3' max depth S Water  
BL Gum, which Gum & ashes a  
more water tolerant? ✓

→ buttress trunk of Sw Gum in water  
No good veg. & hydroly. evidence of re-  
cent flooding

rotten egg smell

no or  
minimal  
vascular  
plants - pure trees





### Stream Characterization Form

Reach ID: SD SWOG

Investigators: JK CTR

Weather: partly sunny ~70°

Stream: Fleming Date: 5/3/11

#### TYPE 1

- ☐ Well developed baseflow and bankfull channel
- ☐ Consistent floodplain features easily identified
- ☐ Predictable channel morphology
- ☐ One terrace apparent above active floodplain
- ☐ Floodplain covered by diverse vegetation
- ☐ Streambanks <= 45 degree

#### TYPE 2

- ☐ Headcuts
- ☐ Exposed cultural features (channel bottom)
- ☐ Sediment deposits absent or sparse
- ☐ Exposed bedrock (part of reach)
- ☐ Streambank slopes > 45 degree

#### TYPE 3

- ☐ Streambank sloughing
- ☐ Sloughed material eroding
- ☐ Streambank slopes > 60 degree or vertical/undercut
- ☒ Accelerated bend migration
- ☐ Erosion on inside of bends
- ☐ Exposed cultural features (channel banks)
- ☐ Exposed bedrock (majority of reach)

#### TYPE 4

- ☐ Streambank aggrading
- ☐ Sloughed material not eroded
- ☐ Sloughed material colonized by vegetation
- ☐ Baseflow, bankfull and floodplain channel developing
- ☐ Predictable channel morphology developing
- ☐ Streambank slopes <= 45 degree

#### TYPE 5

- ☐ Well developed baseflow and bankfull channel
- ☐ Consistent floodplain features easily identified
- ☐ Two terraces apparent above active floodplain
- ☐ Predictable channel morphology
- ☐ Streambanks <= 45 degree

#### Notes

Assigned CEM Type

Dominant Substrate

Representative of \_\_\_\_\_ % of total reach length

1. Clay 2. Silt 3. Sand 4. Gravel 5. Cobble  
6. Boulder 7. Bedrock 8. Other (specify)

Comments

N/A  
wetland

10 mi





**J.M. WALLER\***  
**ASSOCIATES, INC.**

**A SERVICE DISABLED VETERAN OWNED SMALL BUSINESS**

### Cross Section Data

Reach ID:\_\_\_\_\_

Investigators:

Date:\_\_\_\_\_

Watershed:

Stream:

[illegible]



## In-Stream Characteristics Form

Reach ID: SDSW06

Investigators: JK CJR

Date: 5/3/11

Watershed: \_\_\_\_\_ Stream: Fleming

### A. Water Appearance

- ☒ 1. Clear ☐ 6. Dark Brown  
☐ 2. Milky ☐ 7. Oily Sheer  
☐ 3. Foamy ☐ 8. Reddish  
☐ 4. Turbid ☐ 9. Greenish  
☐ 5. Light Brown Other \_\_\_\_\_

### B. Water Odor

- ☐ 1. Sewage ☐ 4. Rotten Eggs  
☐ 2. Chlorine ☒ 5. None  
☐ 3. Fishy  
Other \_\_\_\_\_

### C. Sediment Odor

- ☐ 1. Sewage ☒ 4. Rotten Eggs Slight  
☐ 2. Chlorine ☐ 5. Oxidation  
☐ 3. Petroleum ☐ 6. None  
Other \_\_\_\_\_

### D. Fish

- ☐ None  
☒ Small (1-2 in.)  
☐ Medium (3-6 in.)  
☐ Large (7 in. & above)

### E. Aquatic Plants

- Percent Area: ☒ 0% ☐ 10 - 30 %  
☐ 1 - 10 % ☐ 30 - 50 %  
☐ > 50%  
If present, are they: ☐ Attached ☐ Free-flowing  
Where are they located?  
☐ Stream margin ☐ Pools ☐ Near riffles  
None noted near shores

### F. Algae

- Algae "slime" coating: ☐ None ☒ Light ☐ Heavy  
Color: ☒ Brown ☐ Green Other \_\_\_\_\_  
Filamentous Algae: ☒ None ☐ Green ☐ Orange  
☐ Brown Other \_\_\_\_\_  
Floating Algae: ☒ None ☐ Brown ☐ Green Other \_\_\_\_\_

### G. Sediment Appearance/Classification

Size: \_\_\_\_\_  
Material Type: \_\_\_\_\_  
Substrate Deposition: \_\_\_\_\_  
Bottom Substrate/Available Cover: \_\_\_\_\_  
Channel Alteration: \_\_\_\_\_  
Channel Sinuosity: \_\_\_\_\_  
Erosion: \_\_\_\_\_  
Bank Stability (LB & RB): \_\_\_\_\_  
Vegetated Buffer Zone Width: \_\_\_\_\_

#### USCS Classification

- ☐ GW well graded gravel, fine to coarse gravel  
☐ GP poorly graded gravel  
☐ GM silty gravel  
☐ GC clayey gravel  
☐ SW well graded sand, fine to coarse sand  
☐ SP poorly-graded sand  
☒ SM silty sand Predominant sed/soil  
☐ SC clayey sand  
☐ ML silt  
☐ CL clay  
☐ OL organic silt, organic clay  
☐ MH silt of high plasticity, elastic silt  
☐ CH clay of high plasticity, fat clay  
☐ OH organic clay, organic silt  
☐ Pt peat

#### Notes

No channel, wetland area  
- w/ thud plants yes  
mainly cattail & Yellow Flag, & sedges



# Wetland Sketch

Note: Identify trees, shrubs, vegetation, grasses within stream bank and wetland areas

Location  
Φ

- consisted of open water w/ wetlands  
along either side (shores)  
photos show best

Photo

## Notes:

Distances are measured from left bank looking downstream.

Use feature abbreviations from the following list, as shown in figure (WS refers to baseflow water surface):

TOLB - Top of left bank

BKP - Breakpoint

LCB - Left channel Bottom

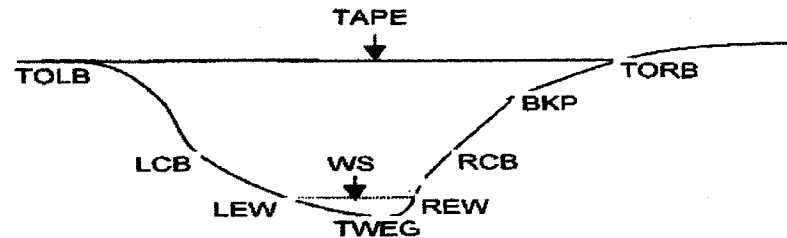
LEW - Left edge of water

TWEG - Thalweg

REW - Right edge of water

RCB - Right channel bottom

TORB - Top of right bank





Wtlnd confined to valley area  
bet railroad & Bank of America side

ADDITIONAL NOTES

Trees along either side include

Red Maple, Box Elder, Hop Hornbeam  
1 <sup>large</sup> Willow hanging in creek, <sup>afew sycamore</sup> ~~small~~ <sup>→</sup>  
Wtlnd predominated by cattail (narrow leaf)

(Yellow flower? Plant) ~~at~~ <sup>below</sup> Yellow Flag -  
area from <sup>confl.</sup> creek to sampling pt. <sup>invasive sp.</sup>

Max area  $300' \times 400' = 12000 \text{ ft}^2$  area  $1/4 \text{ ac.}$

including creek, S.W., <sup>very</sup> sat. soils on edge  
<sup>up to toe slope</sup>

- Smart weed on edge creek / Wtlnd
- Started photos at creek / Wtlnd confluence & headed down into Wtlnd area.

mucky, brown, sat. soils - water stained leaves  
to toe of slope, evidence of past Flooding, water  
line

- on little island area near sample pt. → saw  
SPIKE rush, <sup>mint</sup> <sup>water</sup> <sup>shamrock</sup> <sup>some other small</sup>  
<sup>grasses</sup> <sup>vacuaries</sup>

- could not pick up any perceived flow  
at either sampling location or @ confluence  
w/ creek, strong head wind against  
flow also made Q est. diff.

sampling Location #6 Wtlnd



almost ran out; spring boxes other side rd.

### Stream Characterization Form

Reach ID: SWSD080

Investigators: JK CJB

Weather: cloudy

Stream: Fleunigum Date: 5/3/11

#### TYPE 1

- ☐ Well developed baseflow and bankfull channel
- ☐ Consistent floodplain features easily identified
- ☐ Predictable channel morphology
- ☐ One terrace apparent above active floodplain
- ☐ Floodplain covered by diverse vegetation
- ☐ Streambanks <= 45 degree

#### TYPE 2

- ☐ Headcuts
- ☐ Exposed cultural features (channel bottom)
- ☐ Sediment deposits absent or sparse
- ☐ Exposed bedrock (part of reach)
- ☐ Streambank slopes > 45 degree

#### TYPE 3

- ☐ Streambank sloughing
- ☐ Sloughed material eroding
- ☐ Streambank slopes > 60degree or vertical/undercut
- ☒ Accelerated bend migration
- ☐ Erosion on inside of bends
- ☐ Exposed cultural features (channel banks)
- ☐ Exposed bedrock (majority of reach)

further down by road

#### TYPE 4

- ☒ Streambank aggrading
- ☒ Sloughed material not eroded
- ☒ Sloughed material colonized by vegetation
- ☒ Baseflow, bankfull and floodplain channel developing
- ☒ Predictable channel morphology developing
- ☒ Streambank slopes <= 45 degree

#### TYPE 5

- ☐ Well developed baseflow and bankfull channel
- ☐ Consistent floodplain features easily identified
- ☐ Two terraces apparent above active floodplain
- ☐ Predictable channel morphology
- ☐ Streambanks <= 45 degree

#### Notes

Assigned CEM Type

4

Dominant Substrate

sand

Representative of 100 % of total reach length

1. Clay 2. Silt 3. Sand 4. Gravel 5. Cobble  
6. Boulder 7. Bedrock 8. Other (specify)

Comments

stream banks  
were more stable  
just D/S from sampling  
location.

mixed Bag  
"in sample"  
"pool" location

4 - type were  
we are about 3

further  
down by road, more erosion





Reach ID: SWSD89 Investigators: JK CJR

Date: 5/3/11 Watershed: \_\_\_\_\_

Stream: Fleannigan

[illegible]



## In-Stream Characteristics Form

Reach ID: SWSD 08

Investigators: JK CJB

Date: 5/3/11 1310

Watershed: \_\_\_\_\_ Stream: Fleminham

### A. Water Appearance

- ☒ 1. Clear ☐ 6. Dark Brown  
☐ 2. Milky ☐ 7. Oily Sheer  
☐ 3. Foamy ☐ 8. Reddish  
☐ 4. Turbid ☐ 9. Greenish  
☐ 5. Light Brown Other \_\_\_\_\_

### B. Water Odor

- ☐ 1. Sewage ☐ 4. Rotten Eggs  
☐ 2. Chlorine ☒ 5. None  
☐ 3. Fishy  
Other \_\_\_\_\_

### C. Sediment Odor

- ☐ 1. Sewage ☐ 4. Rotten Eggs  
☐ 2. Chlorine ☐ 5. Oxidation  
☐ 3. Petroleum ☒ 6. None  
Other \_\_\_\_\_

### D. Fish

- ☐ None  
☒ Small (1-2 in.) minnows  
☐ Medium (3-6 in.)  
☐ Large (7 in. & above)

### E. Aquatic Plants

- Percent Area: ☐ 0% ☐ 10 - 30 %  
☒ 1 - 10 % ☐ 30 - 50 %  
☐ > 50 %  
If present, are they ☒ Attached ☐ Free-flowing  
Where are they located?  
☐ Stream margin ☒ Pools ☒ in riffles

### F. Algae

- Algae "slime" coating: ☐ None ☒ Light ☐ Heavy  
Color: ☒ Brown ☐ Green Other \_\_\_\_\_  
Filamentous Algae: ☒ None ☐ Green ☐ Orange  
☐ Brown Other \_\_\_\_\_  
Floating Algae: ☒ None ☐ Brown ☐ Green Other \_\_\_\_\_

### G. Sediment Appearance/Classification

Size: \_\_\_\_\_  
Material Type: \_\_\_\_\_  
Substrate Deposition: \_\_\_\_\_  
Bottom Substrate/Available Cover: \_\_\_\_\_  
Channel Alteration: \_\_\_\_\_  
Channel Sinuosity: \_\_\_\_\_  
Erosion: \_\_\_\_\_  
Bank Stability (LB & RB): Stable OK sampling  
Vegetated Buffer Zone Width: NOT ANY

#### USCS Classification

- ☐ GW well graded gravel, fine to coarse gravel  
☐ GP poorly graded gravel  
☐ GM silty gravel  
☐ GC clayey gravel  
☒ SW well graded sand, fine to coarse sand  
☐ SP poorly-graded sand  
☐ SM silty sand  
☐ SC clayey sand  
☐ ML silt  
☐ CL clay  
☐ OL organic silt, organic clay  
☐ MH silt of high plasticity, elastic silt  
☐ CH clay of high plasticity, fat clay  
☐ OH organic clay, organic silt  
☐ Pt peat

#### Notes

Down where I was, below sampling area, sand & gravel, in sed water sampling area mixed bag everything



# Wetland Sketch

Note: Identify trees, shrubs, vegetation, grasses within stream bank and wetland areas

NA

## Notes:

Distances are measured from left bank looking downstream.

Use feature abbreviations from the following list, as shown in figure (WS refers to baseflow water surface):

TOLB - Top of left bank

BKP - Breakpoint

LCB - Left channel Bottom

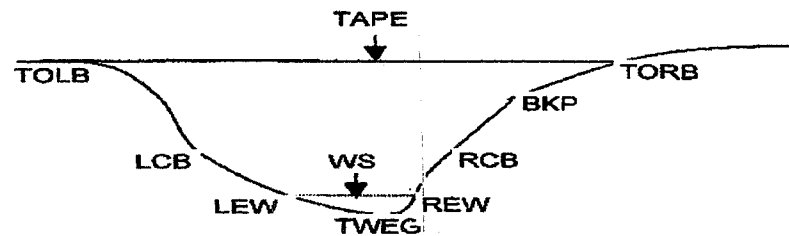
LEW - Left edge of water

TWEG - Thalweg

REW - Right edge of water

RCB - Right channel bottom

TORB - Top of right bank







J.M. WALLER  
ASSOCIATES, INC.

A SERVICE DISABLED VETERAN OWNED SMALL BUSINESS

Sampling  
Location 08

### ADDITIONAL NOTES

not really dense cover  
trees in fldpn & along  
stream bank only

Veg trees only on rti side stream  
when looking D/S a mix of  
Sycamore, Red Maple, Asher, Sw Gum  
~~Viburnum~~ hop hornbeam, BL Gum,

Stream CEM 324, mostly 4, 3  
farther D/S by road

- ferns, grasses, cleaverweed in fld plain area

- alot more Q in stream  
after rain, almost rained out!  
- veg. buffer yes, but not a lot  
of trees

$$\text{wetted perimeter} = 5' \times .25' = 1.25 \text{ ft}^2$$
$$Q = 1.25 \text{ ft}^2 \times 1 \text{ ft/s} =$$

Flow,  
5' across  
depth .25'  
water

vel. 1 ft/s

$$\text{Area} = 1.25 \text{ ft}^2$$

$$Q = 1.25$$
$$\sim 1 \text{ ft}^3/\text{s}$$

2 max.

Q increased after heavy  
rain & water turned turbid





cat near stream

### Stream Characterization Form

Reach ID: SDSW09

Investigators: JK CJR

Weather:

Stream: Flennum Date: 5/3/11

1150

#### TYPE 1

- ☐ Well developed baseflow and bankfull channel
- ☐ Consistent floodplain features easily identified
- ☐ Predictable channel morphology
- ☐ One terrace apparent above active floodplain
- ☐ Floodplain covered by diverse vegetation
- ☐ Streambanks <= 45 degree

#### TYPE 2

- ☐ Headcuts
- ☐ Exposed cultural features (channel bottom)
- ☐ Sediment deposits absent or sparse
- ☐ Exposed bedrock (part of reach)
- ☐ Streambank slopes > 45 degree

#### TYPE 3

- ☒ Streambank sloughing
- ☒ Sloughed material eroding
- ☒ Streambank slopes > 60 degree or vertical/undercut
- ☒ Accelerated bend migration
- ☒ Erosion on inside of bends
- ☒ Exposed cultural features (channel banks)
- ☒ Exposed bedrock (majority of reach)

#### TYPE 4

- ☐ Streambank aggrading
- ☐ Sloughed material not eroded
- ☐ Sloughed material colonized by vegetation
- ☐ Baseflow, bankfull and floodplain channel developing
- ☐ Predictable channel morphology developing
- ☐ Streambank slopes <= 45 degree

#### TYPE 5

- ☐ Well developed baseflow and bankfull channel
- ☐ Consistent floodplain features easily identified
- ☐ Two terraces apparent above active floodplain
- ☐ Predictable channel morphology
- ☐ Streambanks <= 45 degree

#### Notes

Assigned CEM Type  
Dominant Substrate

3  
1 & 2

Representative of 100 % of total reach length  
1. Clay 2. Silt 3. Sand 4. Gravel 5. Cobble  
6. Boulder 7. Bedrock 8. Other (specify)

Comments

Rounded Banks at  
stream cut, see photos  
Type 3 @ sampling location  
& going upstream to culvert





### Cross Section Data

Date: 5/3/11 Watershed: \_\_\_\_\_ Stream: Fleennigan

X-Section	Distance from Left Bank (ft)	Depth (ft)	Feature Abbreviation
	0	0	TOB
	1	1.1	bank
	2	2.2	bank
	3	3.8	stream
	4	3.85	
	5	4.3	TWEG
	6	4.2	TWEG
	7	4.2	TWEG
	8	4.0	
	9	3.75	
	10	3.5	stream
	11	1.9	<del>subbank</del>
	12	1.3	bank
	13	1.0	bank
	14	0	TOB



## In-Stream Characteristics Form

Reach ID: SWSD 09

Investigators: JK CJR

Date: 5/3/11 1150

Watershed: \_\_\_\_\_ Stream: Fleming

### A. Water Appearance

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> 1. Clear | <input type="checkbox"/> 6. Dark Brown |
| <input type="checkbox"/> 2. Milky            | <input type="checkbox"/> 7. Oily Sheer |
| <input type="checkbox"/> 3. Foamy            | <input type="checkbox"/> 8. Reddish    |
| <input type="checkbox"/> 4. Turbid           | <input type="checkbox"/> 9. Greenish   |
| <input type="checkbox"/> 5. Light Brown      | Other _____                            |

### B. Water Odor

- |                                      |   |
|--------------------------------------|---|
| <input type="checkbox"/> 1. Sewage   | <input type="checkbox"/> 4. Rotten Eggs     |
| <input type="checkbox"/> 2. Chlorine | <input checked="" type="checkbox"/> 5. None |
| <input type="checkbox"/> 3. Fishy    | Other _____                                 |

### C. Sediment Odor

- |                                       |   |
|---------------------------------------|---|
| <input type="checkbox"/> 1. Sewage    | <input type="checkbox"/> 4. Rotten Eggs     |
| <input type="checkbox"/> 2. Chlorine  | <input type="checkbox"/> 5. Oxidation       |
| <input type="checkbox"/> 3. Petroleum | <input checked="" type="checkbox"/> 6. None |
| Other _____                           |   |

### D. Fish

- |   |      |
|---|------|
| <input type="checkbox"/> None                       | 10v2 |
| <input checked="" type="checkbox"/> Small (1-2 in.) |      |
| <input type="checkbox"/> Medium (3-6 in.)           |      |
| <input type="checkbox"/> Large (7 in. & above)      |      |

### E. Aquatic Plants

- Percent Area: ☐ 0% ☐ 10 - 30 %  
☒ 1 - 10 % ☐ 30 - 50 %  
☐ > 50 %
- If present, are they: ☒ Attached ☐ Free-flowing
- Where are they located?  
☐ Stream margin ☒ Pools ☐ Near riffles

### F. Algae

- Algae "slime" coating: ☐ None ☒ Light ☐ Heavy  
 Color: ☒ Brown ☐ Green Other \_\_\_\_\_
- Filamentous Algae: ☒ None ☐ Green ☐ Orange  
☐ Brown Other \_\_\_\_\_
- Floating Algae: ☒ None ☐ Brown ☐ Green Other \_\_\_\_\_

### G. Sediment Appearance/Classification

Size: \_\_\_\_\_  
 Material Type: \_\_\_\_\_  
 Substrate Deposition: yes  
 Bottom Substrate/Available Cover: \_\_\_\_\_  
 Channel Alteration: culvert  
 Channel Sinuosity: \_\_\_\_\_  
 Erosion: yes  
 Bank Stability (LB & RB): yes  
 Vegetated Buffer Zone Width: 10' max

#### USCS Classification

- |                                     |   |
|-------------------------------------|---|
| <input type="checkbox"/>            | <b>GW</b> well graded gravel, fine to coarse gravel |
| <input checked="" type="checkbox"/> | <b>GP</b> poorly graded gravel                      |
| <input type="checkbox"/>            | <b>GM</b> silty gravel                              |
| <input type="checkbox"/>            | <b>GC</b> clayey gravel                             |
| <input type="checkbox"/>            | <b>SW</b> well graded sand, fine to coarse sand     |
| <input checked="" type="checkbox"/> | <b>SP</b> poorly-graded sand                        |
| <input type="checkbox"/>            | <b>SM</b> silty sand                                |
| <input type="checkbox"/>            | <b>SC</b> clayey sand                               |
| <input type="checkbox"/>            | <b>ML</b> silt                                      |
| <input type="checkbox"/>            | <b>CL</b> clay                                      |
| <input type="checkbox"/>            | <b>OL</b> organic silt, organic clay                |
| <input type="checkbox"/>            | <b>MH</b> silt of high plasticity, elastic silt     |
| <input type="checkbox"/>            | <b>CH</b> clay of high plasticity, fat clay         |
| <input type="checkbox"/>            | <b>OH</b> organic clay, organic silt                |
| <input type="checkbox"/>            | <b>Pt</b> peat                                      |

### Notes

velocity = 0.5 ft/s  
 stream wetted perimeter = 3.5 ft  
 max Q = 2c-ft

sandy gravel  
 in reach sampling pt.



# Wetland Sketch <sup>2/4</sup>

Note: Identify trees, shrubs, vegetation, grasses within stream bank and wetland areas

some veg.  
in riparian  
mud  
on rt. bank  
> eroded

29

## Notes:

Distances are measured from left bank looking downstream.

Use feature abbreviations from the following list, as shown in figure (WS refers to baseflow water surface):

TOLB - Top of left bank

BKP - Breakpoint

LCB - Left channel Bottom

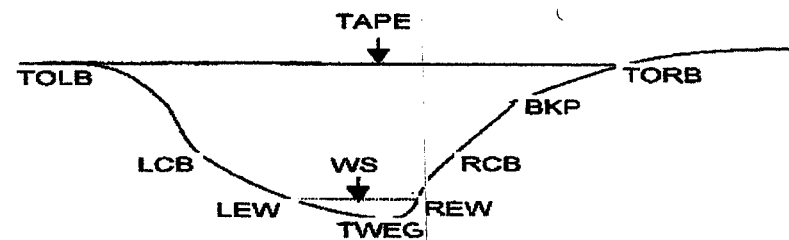
LEW - Left edge of water

TWEG - Thalweg

REW - Right edge of water

RCB - Right channel bottom

TORB - Top of right bank

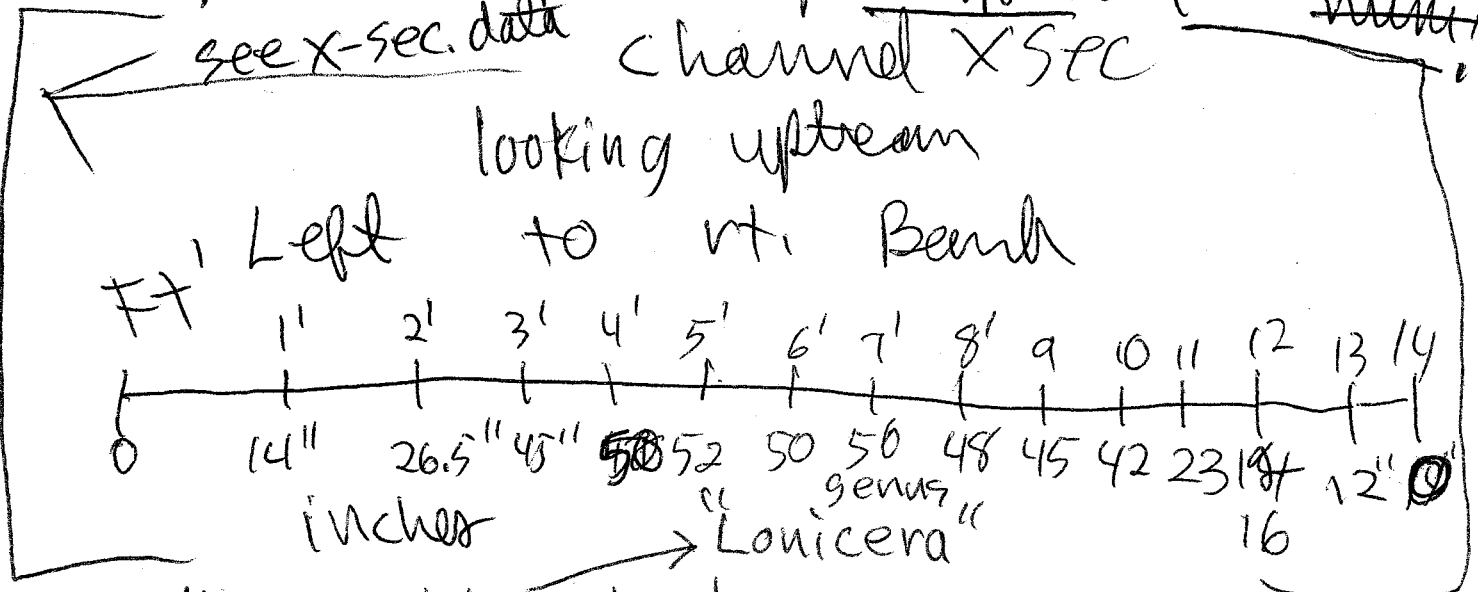


0.5 ft/s



**ADDITIONAL NOTES**

Banks actively eroding, as per photos  
 Veg, <sup>noted</sup> from culvert downstream is  
 a lot of Sycamores, tulip poplars, Red Maple  
VA Pine?, a few Box Elders,  
 some sort of common shrub (Peyton) <sup>real</sup> ~~Viburnum~~ <sup>Honey Suckle Shrub</sup>  
 a few wild cherry, ashes  
 No vascular plants except ferns noted <sup>Viburnum</sup>  
 see x-sec. data channel X sec



— Honeysuckle shrub very common in area  
 both sides creek, esp. near culvert

water depth ~ 6" middle

Flow

$7' \times 0.5' = 3.5 \text{ ft}^2$

$3 \text{ ft}^2 \times 0.5 \text{ ft/sec} \leq 3 \text{ ft}^2$

$Q = 1.5 \text{ ft}^3/\text{sec.} (\sim 2 \text{ ft}^3/\text{s})$



**SMOKEY MOUNTAIN SMELTERS**  
**KNOXVILLE, TENNESSEE**

**September 2011**  
**RI/FS Phase 4 Sampling Event**

**Sampling Logs**  
**Book 1 of 1**



**J.M.WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**





**J.M. WALLER<sup>TM</sup>**  
**ASSOCIATES, INC.**

**MANAGING THE VISION<sup>TM</sup>**

A SERVICE DISABLED VETERAN OWNED SMALL BUSINESS

## SOIL & SEDIMENT SAMPLE LOG SHEET

Page 1 of     

Project Site Name: Smoky Mtn Sulfater  
Project No.:                     

- ☐ Surface Soil  
☐ Subsurface Soil  
☒ Sediment  
☐ Other:                       
☐ QA Sample Type:

Sample ID No.: SMSS15W2D

Sample Location: Embassy Mnt

Sampled By: Jed Delong / K. Egan

C.O.C. No.:                     

Type of Sample:

- ☒ Low Concentration  
☐ High Concentration

### GRAB SAMPLE DATA:

Date: <u>9/20/2011</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>11:13 AM</u>	<u>0-1"</u>	<u>DK Brown</u>	<u>Fine organic muck / High moisture content</u>
Method: <u>Pond</u>			
Monitor Reading (ppm):			

### COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>Cupride, TA, Metals including Pb</u>	<u>502 glass</u>		

### OBSERVATIONS / NOTES:

<u>N 35.89562</u> <u>W 083.98083</u>	
---	--

Circle if Applicable:

MS/MSD	Duplicate ID No.: <u>                    </u>	Signature(s): <u>Jed Delong</u>
--------	---	---------------------------------





**J.M. WALLER<sup>TM</sup>**  
**ASSOCIATES, INC.**

MANAGING THE VISION<sup>TM</sup>

A SERVICE DISABLED VETERAN OWNED SMALL BUSINESS

## SOIL & SEDIMENT SAMPLE LOG SHEET

Page 2 of 2

Project Site Name: <u>Smoky Mtn. Shelter</u>		Sample ID No.: <u>SMSSDSW19</u>		
Project No.: _____		Sample Location: <u>Embrey</u>		
<input type="checkbox"/> Surface Soil		Sampled By: <u>T. Delong / K. Eary</u>		
<input type="checkbox"/> Subsurface Soil		C.O.C. No.: _____		
<input checked="" type="checkbox"/> Sediment		Type of Sample:		
<input type="checkbox"/> Other: _____		<input checked="" type="checkbox"/> Low Concentration		
<input type="checkbox"/> QA Sample Type: _____		<input type="checkbox"/> High Concentration		
<b>GRAB SAMPLE DATA:</b>				
Date: <u>9/12/11</u>	Depth Interval: <u>53"</u>	Color: <u>dk Brown</u>	Description (Sand, Silt, Clay, Moisture, etc.): <u>fine organic MUCK / high moisture content</u>	
Time: <u>11:27 AM</u>				
Method: <u>core</u>				
Monitor Reading (ppm):				
<b>COMPOSITE SAMPLE DATA:</b>				
Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				
<b>SAMPLE COLLECTION INFORMATION:</b>				
Analysis: <u>CN, TAL Metals including Hg</u>	Container Requirements: <u>for glass</u>	Collected	Other	
<b>OBSERVATIONS / NOTES:</b>		<b>MAP:</b>		
<u>N 35.89637</u> <u>W 083.95096</u>				
<b>Circle if Applicable:</b>		<b>Signature(s):</b>		
<input type="checkbox"/> MS/MSD	Duplicate ID No.: _____	<u>[Signature]</u>		





**J.M. WALLER™**  
**ASSOCIATES, INC.**

MANAGING THE VISION™

A SERVICE DISABLED VETERAN OWNED SMALL BUSINESS

**SOIL & SEDIMENT SAMPLE LOG SHEET**

Page 3 of       

Project Site Name: Spokan Air Station

Project No.:                                 

Sample ID No.: SMS05W18

Sample Location: Embayment

Sampled By: T. Delaney / K. Farley

C.O.C. No.:                                 

☐ Surface Soil

☐ Subsurface Soil

☒ Sediment

☐ Other:                                 

☐ QA Sample Type:                                 

Type of Sample:

☒ Low Concentration

☐ High Concentration

**GRAB SAMPLE DATA:**

Date: 9/26/11 Depth Interval: 50" Color: Dr Brown Description (Sand, Silt, Clay, Moisture, etc.): fine, more gravel/rocks, more coarse organic material

Time: 11:53 AM

Method: grab

Monitor Reading (ppm):                                 

**COMPOSITE SAMPLE DATA:**

Date:                                  Time:                                  Depth Interval:                                  Color:                                  Description (Sand, Silt, Clay, Moisture, etc.):                                 

Method:                                 

Monitor Readings (Range in ppm):                                 

**OBSERVATIONS / NOTES:**

**MAP:**

U. 35. 89711  
W 083. 95103

Circle if Applicable:

MS/MSD

Duplicate ID No.:                                 

Signature(s): [Signature]





**J.M. WALLER<sup>™</sup>**  
**ASSOCIATES, INC.**

MANAGING THE VISION<sup>™</sup>

A SERVICE DISABLED VETERAN OWNED SMALL BUSINESS

## SOIL & SEDIMENT SAMPLE LOG SHEET

Page 4 of     

Project Site Name: <u>Smoky Mts. Smelter</u>		Sample ID No.: <u>SMSSDSW19</u>		
Project No.: <u>                    </u>		Sample Location: <u>methuana</u>		
<input type="checkbox"/> Surface Soil		Sampled By: <u>T. Delong, IL-essy</u>		
<input type="checkbox"/> Subsurface Soil		C.O.C. No.: <u>                    </u>		
<input checked="" type="checkbox"/> Sediment		Type of Sample:		
<input type="checkbox"/> Other: <u>                    </u>		<input checked="" type="checkbox"/> Low Concentration		
<input type="checkbox"/> QA Sample Type: <u>                    </u>		<input type="checkbox"/> High Concentration		
<b>GRAB SAMPLE DATA:</b>				
Date: <u>9/20/11</u>	Depth Interval: <u>30"</u>	Color: <u>dk. Brown</u>	Description (Sand, Silt, Clay, Moisture, etc.): <u>more coarse organic material, fine silt, little sand</u>	
Time: <u>12:19 PM</u>				
Method: <u>pan</u>				
Monitor Reading (ppm):				
<b>COMPOSITE SAMPLE DATA:</b>				
Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings				
(Range in ppm):				
<b>SAMPLE COLLECTION INFORMATION:</b>				
Analysis	Container Requirements	Collected	Other	
<u>CRITICAL METALS w/ Hg</u>	<u>90% glass jar</u>			
<b>OBSERVATIONS / NOTES:</b>		<b>MAP:</b>		
<u>N. 35. 89801</u> <u>W. 0 83. 95148</u>				
Circle if Applicable:		Signature(s):		
<input type="checkbox"/> MS/MSD	Duplicate ID No.: <u>                    </u>	<u>K. Delong</u>		





**J.M. WALLER<sup>TM</sup>**  
**ASSOCIATES, INC.**

**MANAGING THE VISION<sup>TM</sup>**

A SERVICE DISABLED VETERAN OWNED SMALL BUSINESS

# SOIL & SEDIMENT SAMPLE LOG SHEET

Page 5 of     

Project Site Name: <u>Smoky Mtn. Shelter</u>		Sample ID No.: <u>MS-01-16</u>
Project No.: <u>    </u>		Sample Location: <u>Upstream</u>
<input type="checkbox"/> Surface Soil		Sampled By: <u>T. delany/K. ray</u>
<input type="checkbox"/> Subsurface Soil		C.O.C. No.: <u>    </u>
<input checked="" type="checkbox"/> Sediment		Type of Sample:
<input type="checkbox"/> Other: <u>    </u>		<input checked="" type="checkbox"/> Low Concentration
<input type="checkbox"/> QA Sample Type: <u>    </u>		<input type="checkbox"/> High Concentration

## GRAB SAMPLE DATA:

Date: <u>9/21/11</u>	Depth Interval: <u>25"</u>	Color: <u>Dr. Brown</u>	Description (Sand, Silt, Clay, Moisture, etc.): <u>more coarse organic material, fine silt, little sand</u>
Time: <u>12:37 PM</u>			
Method: <u>Boat</u>			
Monitor Reading (ppm): <u>    </u>			

## COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

## SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>Cn, TAC, Metals w/ Hg</u>	<u>8 oz. glass jar</u>		

## OBSERVATIONS / NOTES:

## MAP:

N. <u>35.89890</u> W. <u>083.95001</u> Flow meter: <u>0.22</u> <sup>FE</sup> MPH <u>0.22 (Avg. speed)</u>		Signature(s): <u>K. Ewing</u>
Circle if Applicable:	Duplicate ID No.: <u>    </u>	
<input type="checkbox"/> MS/MSD		





**J.M. WALLER<sup>TM</sup>**  
**ASSOCIATES, INC.**

MANAGING THE VISION<sup>TM</sup>

A SERVICE DISABLED VETERAN OWNED SMALL BUSINESS

## SOIL & SEDIMENT SAMPLE LOG SHEET

Page 6 of     

Project Site Name: Smoky Mtn. Smelter

Project No.:                     

- ☐ Surface Soil  
☐ Subsurface Soil  
☒ Sediment  
☐ Other:                       
☐ QA Sample Type:

Sample ID No.: SMSSD5015

Sample Location: Wetland, 0-10

Sampled By: T. DeLong / W. Emy

C.O.C. No.:                     

Type of Sample:

- ☒ Low Concentration  
☐ High Concentration

### GRAB SAMPLE DATA:

Date: <u>9/26/11</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>12:00 PM</u>	<u>11"</u>	<u>Dr. Brown</u>	<u>Fine, silty, organic rich</u>
Method: <u>Van Dorn</u>			
Monitor Reading (ppm):			

### COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>Critical Metals w/Hg</u>	<u>8 oz. glass jar</u>		

### OBSERVATIONS / NOTES:

<u>W. 35.89991</u> <u>W. 083.95008</u> <u>Flow meter: 0.00 MPH</u> <u>Arg speed: 0.00 MPH</u>	
Circle if Applicable: <input type="checkbox"/> MS/MSD <input type="checkbox"/> Duplicate ID No.: <u>                    </u>	Signature(s): <u>T. DeLong</u>





## MANAGING THE VISION

A SERVICE DISABLED VETERAN OWNED SMALL BUSINESS

## Page 7 of 10

Project Site Name: Subcap mtn smelter

Project No.: \_\_\_\_\_

☐ Surface Soil

☐ Subsurface Soil

☒ Sediment

☐ Other: MS/MSD

☐ QA Sample Type: \_\_\_\_\_

Sample ID No.: SMSSDW11

Sample Location: BL02

Sampled By: T. Delong/K-E

C.O.C. No.: \_\_\_\_\_

Type of Sample:

☒ Low Concentration

☐ High Concentration

Date: 9/26/11	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 2:52 PM	1-4"	DL Brown	thin layer of fine over
Method: Grab			thick clay, sand & gravel
Monitor Reading (ppm):			

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

[illegible]

Minnows - lots of Snails  
N. 35.90745  
W 083.94339

[illegible]

MS/MSD

~~Arthur~~ Ewing

Flow meter: 7.2 mph (avg. speed)





**J.M. WALLER<sup>™</sup>**  
**ASSOCIATES, INC.**

MANAGING THE VISION<sup>™</sup>  
A SERVICE DISABLED VETERAN OWNED SMALL BUSINESS

# SOIL & SEDIMENT SAMPLE LOG SHEET

Page 8 of

Project Site Name: <u>Snyder Mtn. Swell</u>		Sample ID No.: <u>SMSS1 SW14</u>		
Project No.: _____		Sample Location: <u>Older Flon. Branch</u>		
<input type="checkbox"/> Surface Soil		Sampled By: <u>Adelene K. Early</u>		
<input type="checkbox"/> Subsurface Soil		C.O.C. No.: _____		
<input checked="" type="checkbox"/> Sediment		Type of Sample:		
<input type="checkbox"/> Other: _____		<input checked="" type="checkbox"/> Low Concentration		
<input type="checkbox"/> QA Sample Type: _____		<input type="checkbox"/> High Concentration		
<b>GRAB SAMPLE DATA:</b>				
Date: <u>9/27/11</u>	Depth Interval: <u>4-9"</u>	Color: <u>dk brown</u>	Description (Sand, Silt, Clay, Moisture, etc.): <u>Sandy, some gravel</u>	
Time: <u>10:35 AM</u>				
Method: <u>hand grab</u>				
Monitor Reading (ppm): _____				
<b>COMPOSITE SAMPLE DATA:</b>				
Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				
<b>SAMPLE COLLECTION INFORMATION:</b>				
Analysis: <u>TAL Metals, Cu</u>	Container Requirements: <u>8oz. glass jar</u>	Collected	Other	
<b>OBSERVATIONS / NOTES:</b>		<b>MAP:</b>		
<u>N. 35.90567</u> <u>W 083.94463</u>				
Circle if Applicable:		Signature(s):		
<input type="checkbox"/> MS/MSD	Duplicate ID No.: _____	<u>Kristen Egan</u>		

Flow: 9.97 m/s (avg. speed)





## MANAGING THE VISION

## Page 9 of 10

Project Site Name: Project No.:		Sample ID No.: Sample Location: Sampled By: C.O.C. No.:	
<input type="checkbox"/> Surface Soil <input type="checkbox"/> Subsurface Soil <input checked="" type="checkbox"/> Sediment <input type="checkbox"/> Other: <input type="checkbox"/> QA Sample Type:		Type of Sample: <input checked="" type="checkbox"/> Low Concentration <input type="checkbox"/> High Concentration	

GRAB SAMPLE DATA:			
Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9/25/11			
Time: 10:58 AM	9-13"	Lt Brown	West bank: fine / little clay center: sand / gravel
Method: hand grab			
Monitor Reading (ppm)			

COMPOSITE SAMPLE DATA:				
Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:			
Analysis	Container Requirements	Collected	Other
TAU MONALS W/ Hg/CN	8 oz glass jar		

OBSERVATIONS / NOTES:	MAP:
<p>N 35.90798</p> <p>W 083.94120</p>	

Circle if Applicable:	Signature(s):
MS/MSD      Duplicate ID No.:	[Signature] Em

pooled over ~ 30' long w/ nipples  
Flow: 7.9 m<sup>3</sup>/d  
(avg. speed)





**J.M. WALLER™**  
**ASSOCIATES, INC.**

**MANAGING THE VISION™**

A SERVICE DISABLED VETERAN OWNED SMALL BUSINESS

# SOIL & SEDIMENT SAMPLE LOG SHEET

Page 1 of 1

Project Site Name: <u>Smoky Mtn State</u>		Sample ID No.: <u>SMS SDSW12</u>
Project No.:		Sample Location: <u>9A</u>
Sampled By: <u>T. Delong/K. G...</u>		C.O.C. No.:
<input type="checkbox"/> Surface Soil		Type of Sample:
<input type="checkbox"/> Subsurface Soil		<input checked="" type="checkbox"/> Low Concentration
<input checked="" type="checkbox"/> Sediment		<input type="checkbox"/> High Concentration
<input type="checkbox"/> Other:		
QA Sample Type: <u>Field duplicate</u>		

GRAB SAMPLE DATA:			
Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>12:33 PM</u>	<u>4-5"</u>	<u>dk brown</u>	<u>fine sand, some gravel</u>
Method: <u>hand pick</u>			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:				
Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:			
Analysis	Container Requirements	Collected	Other
<u>TA metals with Pb</u>	<u>8 oz. glass jar</u>		

OBSERVATIONS / NOTES:	MAP:
<u>N 35.91721</u> <u>W 083.92953</u>	

Circle if Applicable:	Signature(s): <u>[Signature]</u>
MS/MSD	Duplicate ID No.: <u>SMS SDSW912</u>



**SURFACE WATER SAMPLING LOG**

Sample Location: <b>Embayment</b> <b>SM555W00</b>		Project /Project Number: <b>Shady Mtn. Snetter</b>	Date: <b>9/26/11</b>
Recorded By: <b>Kristina Early</b>		Weather: <b>Overcast</b>	
Photograph #		Site Conditions / Description of adjacent areas: (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)  <b>deciduous trees/shrubs.</b>	
Approx. Stream Width: <b>Parallel to fishing dock</b>			
Approx. Stream Depth: <b>69"</b>			
Turbidity of Water:			
Approx. Surface Water Sample Collection Depth: <b>1' below surface</b>			

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)	Ferrous Iron
11:03 AM	7.75	9.47	357.0 <del>357</del>	21.3	8.41	188.3		0.05 mg/L

**Comments:**

**W 35.89563**  
**W 083.95087**

**Note:** sample locations noted on FSP addendum map.

Field Parameters recorded on 9/27/11 @ 0933. Samples kept on ice overnight so temperature, and DO do not reflect sample location.  
**Frigh**  
**9/27/11**



**SURFACE WATER SAMPLING LOG**

Sample Location: <b>Embarras</b> <b>SMS SWSW19</b>		Project /Project Number: <b>Snakey Mtn Smelter</b>	Date: <b>9/26/11</b>
Recorded By: <b>Kristina Early</b>		Weather: <b>Sunny / Partly cloudy</b>	
Photograph #		Site Conditions / Description of adjacent areas: (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)  <b>Deciduous trees/shrubs</b>	
Approx. Stream Width: <b>Trail to end of</b>			
Approx. Stream Depth: <b>53"</b>			
Turbidity of Water:			
Approx. Surface Water Sample Collection Depth: <b>1' below surface</b>			

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
11:22 <b>AM</b>	8.01	6.36	354.0	19.8	8.94	210.0	

**Ferrous Iron**

**0.55mg/L**

**Comments:**

**N. 35.89637**  
**W. 663.95091**

Parameters collected 2 0956 9/27/11. \*Temperature and DO are not reflecting conditions at sample location as samples have been kept on ice overnight.

**Log 9/27/11**



**SURFACE WATER SAMPLING LOG**

Sample Location: <b>Embayment</b> <b>SMSSDSW 18</b>		Project /Project Number: <b>Sunday Mtn. Shelter</b>	Date: <b>9/26/11</b>
Recorded By:		Weather: <b>sunny / partly cloudy</b>	
Photograph #		Site Conditions / Description of adjacent areas: (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)  <b>Deciduous trees/shrubs</b>	
Approx. Stream Width: <b>Just beyond 1st</b>			
Approx. Stream Depth: <b>56'</b>			
Turbidity of Water:			
Approx. Surface Water Sample Collection Depth: <b>1' below surface</b>			

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
<b>11:38 AM</b>	<b>8.16</b>	<b>15.84</b>	<b>374.0</b>	<b>20.7</b>	<b>9.18</b>	<b>193.3</b>	

Ferrous Iron

**0.01 mg/L**

**Comments:**

**N. 35. 89711**  
**W. 083. 95103**

Samples held overnight on ice - Temp and DO do not reflect sample location conditions

**9/27/11**  
**JW**



**SURFACE WATER SAMPLING LOG**

Sample Location: <u>Wetland area</u> <u>SMSSDSW M</u>		Project /Project Number: <u>Smoky Mtn. Shelter</u>	Date: <u>9/26/11</u>
Recorded By: <u>Kristen Ealy</u>		Weather: <u>Sunny / partly cloudy</u>	
Photograph #		Site Conditions / Description of adjacent areas: (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)  <u>Deciduous trees/shrubs</u>	
Approx. Stream Width: <u>240 yds. Fringe</u>			
Approx. Stream Depth: <u>36"</u>			
Turbidity of Water:			
Approx. Surface Water Sample Collection Depth: <u>1' below surface</u>			

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
12:15 <u>PM</u>	8.03	13.99	532.0	27.2	9.17	200.4	

Ferrus (m)  
0.33 mg/L

**Comments:**

N 35.89801

W 083.95148

9/27/11  
Samples do not reflect location conditions as samples  
held over night on ice for 9/27/11



**SURFACE WATER SAMPLING LOG**

Sample Location: <u>Wetland Area</u> <u>SMSSDSW10</u> <u>1KE</u>		Project /Project Number:	Date: <u>9/20/11</u>
Recorded By: <u>V. Early</u>		Weather: <u>Sunny / partly cloudy</u>	
Photograph #		Site Conditions /Description of adjacent areas: (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)  <u>deciduous trees/shrubs</u>	
Approx. Stream Width:			
Approx. Stream Depth: <u>25"</u>			
Turbidity of Water:			
Approx. Surface Water Sample Collection Depth: <u>1' Below surface</u>			

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
<u>12:30 PM</u>	<u>7.91</u>	<u>13.95</u>	<u>675.0</u>	<u>55.2</u>	<u>8.90</u>	<u>205.8</u>	

Ferron/Iron  
0-0 mg/L

**Comments:**

N 35.89890  
W 083.95061

Flow meter: 0.22 m/s  
(avg. speed)

9/27/11

Samples held on ice overnight - Temp and DO not reflect sample location.

*[Signature]*



**SURFACE WATER SAMPLING LOG**

<b>Sample Location:</b> SMSSDSU015		<b>Project /Project Number:</b> Smoggy Mtn Smelter	<b>Date:</b> 9/26/11
<b>Recorded By:</b> Kristina Ferry		<b>Weather:</b>	
<b>Photograph #</b>		<b>Site Conditions / Description of adjacent areas:</b> (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)  Deciduous trees/shrubs	
<b>Approx. Stream Width:</b>			
<b>Approx. Stream Depth:</b> 11"			
<b>Turbidity of Water:</b>			
<b>Approx. Surface Water Sample Collection Depth:</b> 1' Below Surface			

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
12:49 PM	7.73	11.05	776.0	36.9	8.58	217.2	

Ferrous/Iron  
0.29

**Comments:**

N 35.89991  
W 083.95008

Flow meter:  
0.02 mph (avg. speed)

9/27/11 Samples held on ice over night - Temp. and DO not reflective of sample locations  
LF





**J.M. WALLER ASSOCIATES, INC.**  
A SERVICE DISABLED VETERAN-OWNED SMALL BUSINESS

# **SURFACE WATER SAMPLING LOG**

Sample Location: <b>SKGd SMS SSSW 91</b>	Project /Project Number:	Date: <b>9/26/11</b>
Recorded By: <b>Kristina Emery</b>	Weather: <b>cloudy</b>	
Photograph #	Site Conditions / Description of adjacent areas: (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)	
Approx. Stream Width: <b>4.5'</b>	<ul style="list-style-type: none"> <li>- many gastropods/shells</li> <li>- for ant. &amp; leaf litter</li> <li>- mix of clay, sand, gravel</li> <li>- calm space b/w 2 riffle areas</li> <li>- deciduous trees (walnut, maple, box elder)</li> <li>- shrubs &amp; herbaceous vegetation (dominant: ferns, privet, jewel weed)</li> </ul>	
Approx. Stream Depth: <b>1-4"</b>		
Turbidity of Water:		
Approx. Surface Water Sample Collection Depth: <b>1" below surface</b>		

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
<b>9:30 AM</b>	<b>7.98</b>	<b>10.62</b>	<b>521.0</b>	<b>1.88</b>	<b>9.20</b>	<b>206.2</b>	

Ferrrous Iron  
0.22 mg/L

## **Comments:**

**U. 35. 907 65**

**MS/MSD**

**W. 083. 943 39**

**KE**

**Flow meter: 7.2 mPH (avg. speed)**

**9/27/11 Samples held overnight on ice - Temp. + DO not reflective of sample conditions**



**SURFACE WATER SAMPLING LOG**

<b>Sample Location:</b> SMSSDSW014	<b>Project /Project Number:</b> Sucka / Mtn. Smelter	<b>Date:</b> 9/27/11
<b>Recorded By:</b> Kristina Ealy	<b>Weather:</b> Sunny	
<b>Photograph #</b>	<b>Site Conditions / Description of adjacent areas:</b> (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.) - Steep banks (5-8' vertical) - Veg: ferns, grasses, slightly sloped deciduous shrubs & trees (sycamore, box elder, red maple, ash, honeysuckle) - lots of pools, riffles, small waterfalls.	
<b>Approx. Stream Width:</b> 7'		
<b>Approx. Stream Depth:</b> 4-9"		
<b>Turbidity of Water:</b>		
<b>Approx. Surface Water Sample Collection Depth:</b> 2" below surface		

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
10:27	7.84	19.72	1129	2.58	8.13	192.9	

Ferrous Iron  
0.0 mg/L

**Comments:**

N 35.90565  
W 083.94463

Flow: 9.97 MPH  
(avg. speed)



**SURFACE WATER SAMPLING LOG**

Sample Location: <u>Her. Ground</u> <u>SWSSSW13</u> <u>Wes</u> <u>Maloney</u>		Project /Project Number: <u>Shokey Mt. Smelter</u>	Date: <u>9/27/11</u>
Recorded By: <u>Kristina Early</u>		Weather: <u>Sunny</u>	
Photograph #		Site Conditions / Description of adjacent areas: (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)  <u>pooled area w/ ripples</u> <u>Minnows</u>	
Approx. Stream Width: <u>9'</u>			
Approx. Stream Depth: <u>9-13"</u>			
Turbidity of Water:			
Approx. Surface Water Sample Collection Depth: <u>2" below surface</u>			

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
10:55	7.85	18.92	1402	<u>1.07</u> <u>Ln</u>	8.13	196.2	

Ferrous Iron  
0.03 mg/L

**Comments:**

N 35.90801  
W 083.94117  
Flow: 1.9 MPH  
(avg. speed)



**SURFACE WATER  
SAMPLING LOG**

<b>Sample Location:</b> SMSD SW 12, SMSD SW 912		<b>Project /Project Number:</b> SMAK, MHW, Suter	<b>Date:</b> 9/27/11
<b>Recorded By:</b> Kristina Eary		<b>Weather:</b> Sunny	
<b>Photograph #</b>		<b>Site Conditions / Description of adjacent areas:</b> (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)  - standing pool - small dropping turbine - mosquito @ lake	
<b>Approx. Stream Width:</b> 1-2'			
<b>Approx. Stream Depth:</b> 4-5"			
<b>Turbidity of Water:</b>			
<b>Approx. Surface Water Sample Collection Depth:</b> 2" below surface			

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
12:21 PM	7.11	22.95	6029	44.5	4.71	41.8	

Ferrous (run

0.68 mg/L

**Comments:**

N 35.917 21  
W 083.929 53



**SURFACE WATER  
SAMPLING LOG**

<b>Sample Location:</b> SMS SW 09		<b>Project /Project Number:</b>	<b>Date:</b> 9/27/11
<b>Recorded By:</b> [Signature]		<b>Weather:</b>	
<b>Photograph #</b>		<b>Site Conditions / Description of adjacent areas:</b> (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)	
<b>Approx. Stream Width:</b>			
<b>Approx. Stream Depth:</b>			
<b>Turbidity of Water:</b>			
<b>Approx. Surface Water Sample Collection Depth:</b>			

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
0930	7.67	19.53	2229	3.15	7.57	217.2	

**Comments:**



**SURFACE WATER  
SAMPLING LOG**

<b>Sample Location:</b> SMS SW09 Spring		<b>Project /Project Number:</b>	<b>Date:</b> 9/27/11
<b>Recorded By:</b>		<b>Weather:</b>	
<b>Photograph #</b>		<b>Site Conditions / Description of adjacent areas:</b> (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)	
<b>Approx. Stream Width:</b>			
<b>Approx. Stream Depth:</b>			
<b>Turbidity of Water:</b>			
<b>Approx. Surface Water Sample Collection Depth:</b>			

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
0936	7.81	22.05	1214	151	7.95	205.0	

**Comments:**



**SURFACE WATER  
SAMPLING LOG**

<b>Sample Location:</b> SMS SW 04		<b>Project /Project Number:</b>	<b>Date:</b> 9/27/11
<b>Recorded By:</b>		<b>Weather:</b>	
<b>Photograph #</b>		<b>Site Conditions / Description of adjacent areas:</b> (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)	
<b>Approx. Stream Width:</b>			
<b>Approx. Stream Depth:</b>			
<b>Turbidity of Water:</b>			
<b>Approx. Surface Water Sample Collection Depth:</b>			

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
0952	7.31	19.97	4292	9.26	5.14	234.9	

**Comments:**



**SURFACE WATER  
SAMPLING LOG**

<b>Sample Location:</b> SMSSW08	<b>Project /Project Number:</b>	<b>Date:</b> 9/27/11
<b>Recorded By:</b>	<b>Weather:</b>	
<b>Photograph #</b>	<b>Site Conditions / Description of adjacent areas:</b> (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)	
<b>Approx. Stream Width:</b>		
<b>Approx. Stream Depth:</b>		
<b>Turbidity of Water:</b>		
<b>Approx. Surface Water Sample Collection Depth:</b>		

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
0940	7.67	20.09	2075	3.25	7.20	212.4	

**Comments:**



**SURFACE WATER  
SAMPLING LOG**

<b>Sample Location:</b> SMSW08 Spring	<b>Project /Project Number:</b>	<b>Date:</b> 7/27/11
<b>Recorded By:</b>	<b>Weather:</b>	
<b>Photograph #</b>	<b>Site Conditions / Description of adjacent areas:</b> (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)	
<b>Approx. Stream Width:</b>		
<b>Approx. Stream Depth:</b>		
<b>Turbidity of Water:</b>		
<b>Approx. Surface Water Sample Collection Depth:</b>		

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
0945	7.50	22.25	3574	164	7.37	224.7	

**Comments:**



**SURFACE WATER  
SAMPLING LOG**

<b>Sample Location:</b> SMSSW07	<b>Project /Project Number:</b>	<b>Date:</b> 9/27/11
<b>Recorded By:</b>	<b>Weather:</b>	
<b>Photograph #</b>	<b>Site Conditions / Description of adjacent areas:</b> (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)	
<b>Approx. Stream Width:</b>		
<b>Approx. Stream Depth:</b>		
<b>Turbidity of Water:</b>		
<b>Approx. Surface Water Sample Collection Depth:</b>		

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
	8.41	9.08	256	15.5	10.04	168.4	

**Comments:**



**SURFACE WATER  
SAMPLING LOG**

<b>Sample Location:</b> SMSSW 05	<b>Project /Project Number:</b>	<b>Date:</b> 9/27/11
<b>Recorded By:</b>	<b>Weather:</b>	
<b>Photograph #</b>	<b>Site Conditions / Description of adjacent areas:</b> (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)	
<b>Approx. Stream Width:</b>		
<b>Approx. Stream Depth:</b>		
<b>Turbidity of Water:</b>		
<b>Approx. Surface Water Sample Collection Depth:</b>		

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
	8.20	10.33	385	12.9	10.25	175.8	

**Comments:**



**SURFACE WATER  
SAMPLING LOG**

<b>Sample Location:</b> SMSSW04		<b>Project /Project Number:</b>	<b>Date:</b> 9/27/11
<b>Recorded By:</b>		<b>Weather:</b>	
<b>Photograph #</b>		<b>Site Conditions / Description of adjacent areas:</b> (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)	
<b>Approx. Stream Width:</b>			
<b>Approx. Stream Depth:</b>			
<b>Turbidity of Water:</b>			
<b>Approx. Surface Water Sample Collection Depth:</b>			

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
	7.91	9.70	922	36.6	10.13	190.3	

**Comments:**



**SURFACE WATER  
SAMPLING LOG**

<b>Sample Location:</b> SMSSNW10	<b>Project /Project Number:</b>	<b>Date:</b> 9/27/11
<b>Recorded By:</b>	<b>Weather:</b>	
<b>Photograph #</b>	<b>Site Conditions / Description of adjacent areas:</b> (Include description of submerged vegetation, bank vegetation/cover, Channelization, etc.)	
<b>Approx. Stream Width:</b>		
<b>Approx. Stream Depth:</b>		
<b>Turbidity of Water:</b>		
<b>Approx. Surface Water Sample Collection Depth:</b>		

**KEY**

**Organic Substrate:** detritus (disintegrated coarse organic material: leaves, twigs, bark), muck/mud (fine, rich, loose organic soil), marl (lime-like material such as shells or limestone)

**Inorganic Substrate:** clay (plastic, ultra fine), silt (fine, smooth), sand (gritty, coarse), gravel (diameter 0.1 to 2.5 inches), cobble (diameter 2.5 to 10 inches), boulder (diameter > 10 inches)

**Turbidity:** clear, dull clarity (visibility through water 5+ft), clouded (visibility 2-5ft), highly turbulent (visibility < 2ft)

**Odor:** no odor, trace (intermittent odor near water surface), moderate (weak odor in breathing zone), strong (powerful odor throughout sample location)

Time	pH std. units	Temp degree C	Specific Conductance uohms/cm	Turbidity NTU	DO (mg/L)	ORP (mV)	Q (gpm)
	8.23	11.41	352.0	16.1	9.40	171.8	

**Comments:**



**SMOKEY MOUNTAIN SMELTERS**  
**KNOXVILLE, TENNESSEE**

**April 2012**  
**RI/FS Sampling Event**

**Sediment Sampling Log**  
**Book 1 of 1**



**J.M.WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**



NOTES

04/16/2012. Linda Nyland and CJ Roebuck, both of JM Waller (JMWA) conducting sediment sampling at Smoky Mtn Smelter Site.

0830 Demob from JMWA Atlanta office - travel to Tetra Tech Oak Ridge office for logbook and site key.

<sup>1330</sup>  
~~1300~~ In At site, picked up ice for samples and drinking water from Kroger.

1440 Collect sediment sample @ SMSSD03. All notes pertaining to sample collecting will be recorded on the pre-printed forms following this page.

Note: On 4/15/2012 Linda Nyland decontaminated sampling equipment (stainless steel bowls, spoons, scoops and 2 petite ponars rented from Pine Envr) following GFA protocol. Collected an Equipment Rinse Blank @ 1400 on 4/15/2012 for SVOCs, Pesticides, PCBs, and Metals.

1600 L Nyland and CJ Roebuck stuck in dam carp area that is soft backfill. Waiting for AAA.

1730 At SMSSD04. Dirt work recently has made embankment steep and appear no good path to access CJ. Roebuck call to discuss w/ J. Austin.

1800 SMSSD008 collected.

1930 Lowes for rope / machete -

2000 Hotel.

04/17/2012

0800 L Nyland & CJ Roebuck ice samples, collect Bottle rinse etc for toxicity bioassays.

1100 on Embankment w/ Lee Barron & TDEC. The petite ponar is not picking up sediment - it was confirmed by L Barron attempting. L Barron contacted TDEC to bring s.s. handaugers to collect sample - depth @ SMSSD005 - 60 ft. Return to shore to await augers. Will bag ice.

1300 Lunch. Complete Embankment sampling

<sup>1445</sup>  
1430 Complete Background sample. Prep samples for shipping.

1600 At FedEx to ship Toxicity samples

1645 At SMSSD05 way to cut path to sample location

1725 Cut path to SMSSD04. Taking supplies to collect sample.

1830 Complete Sampling

1900 End Day.

4/18/2012

0800 Prepare samples for shipping

0930 Demob to Atlanta office

*[Signature]*



# **SEDIMENT SAMPLING LOG**

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 4/16/2012
<b>SAMPLE LOCATION:</b> SMS5003		<b>RECORDED BY:</b> Linda Nyland
<b>WEATHER CONDITIONS:</b> Mostly Cloudy / Breezy / 80s		

## **SEDIMENT DATA**

<b>Sample ID:</b> SMS5003	<b>Duplicate:</b> Yes/ <input checked="" type="radio"/> No	<b>Collection Method:</b> stainless steel scoop w/ bowl / spoon (S.S.)
<b>Sample Time:</b> 1440	<b>Duplicate ID:</b> _____	<b>Collection Depth Interval:</b> 0.3 in
<b>Sampled By:</b> L Nyland / CJ Roebuck		<b>MS/MSD:</b> Yes/ <input checked="" type="radio"/> No

## **SAMPLE CONTAINER SPECIFICATION**

Sample Analysis	Number of Containers	Container Type	Sample Volume	Preservative
TCL SVOCs, PESA, PCBs	2	8 oz. glass	Fill to Capacity	Cool to 4° C
TAL Metals	1	8 oz. glass	Fill to Capacity	Cool to 4° C
TCL Pesticides Gran Size	1	8 oz. glass	Fill to Capacity	Cool to 4° C
Aroclors/PCBs Toxicity	1/2	1/2 (8 oz. glass)	Fill to Capacity	Cool to 4° C

## **SEDIMENT OBSERVATIONS**

**Sediment Description:** (Color, Sand, Silt, Clay, etc.)  
 Reddish orange clay w/ some small gravel and some silt

**Photo Number / Description:** (Include direction)  
 #DSCN0436, East Northeast direction facing upstream to  
 upstream facing upstream to SMS5003. sample location  
 In for SMS5003 w/ JMWaller  
 photo time: 1443  
 photographer: Linda Nyland (JMWaller) CJ Roebuck collecting  
 GPS location



# SEDIMENT SAMPLING LOG

SITE NAME: Smokey Mountain Smelters	SITE LOCATION: Knoxville, Tennessee	DATE: 4/16/2012
SAMPLE LOCATION: SMS5008	RECORDED BY: Linda Nyland	
WEATHER CONDITIONS: Mostly Cloudy / 80's / Breezy		

## SEDIMENT DATA

Sample ID: SMS5008	Duplicate: Yes/No <input checked="" type="checkbox"/>	Collection Method: S.S. Scoop w/ S.S. bowl / spoon
Sample Time: 1800	Duplicate ID: _____	Collection Depth Interval: 0-3in
Sampled By: L. Nyland / C. Roebuck MS/MSD: Yes/No <input checked="" type="checkbox"/>		

## SAMPLE CONTAINER SPECIFICATION

Sample Analysis	Number of Containers	Container Type	Sample Volume	Preservative
TCL SVOCs / PCBs / Pest	1/2	8 oz. glass	Fill to Capacity	Cool to 4° C
TAL Metals	1	8 oz. glass	Fill to Capacity	Cool to 4° C
TCL Pesticides Grain Size	1	8 oz. glass	Fill to Capacity	Cool to 4° C
Aroclors/PCBs Toxicity	1/2	1/2 Gal. glass Poly	Fill to Capacity	Cool to 4° C

## SEDIMENT OBSERVATIONS

Sediment Description: (Color, Sand, Silt, Clay, etc.)

silty clay, some gravel, some fine sand

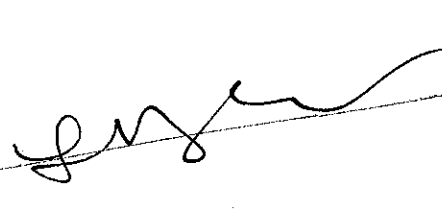


Photo Number / Description: (Include direction)

photo # DSCN0437, facing Northeast. Culvert, upstream from sample location SMS5008.

Photo Time = 1805

photographer: Linda Nyland (J.M. Waller) CJ Roebuck (J.M. Waller)

photo # DSCN0438, facing SE, culvert near sample location SMS5008

photo time: 1806

photographer: CJ Roebuck (J.M. Waller)



### SEDIMENT SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 4/17/2012
<b>SAMPLE LOCATION:</b> #15 SMSSD05		<b>RECORDED BY:</b> L. Nyland
<b>WEATHER CONDITIONS:</b> Overcast / 70's		

### SEDIMENT DATA

<b>Sample ID:</b> SMSSD05	<b>Duplicate:</b> Yes/No <input checked="" type="radio"/> No	<b>Collection Method:</b> <sup>Dr</sup> <del>Nette Ponat</del> , Auger
<b>Sample Time:</b> 1140	<b>Duplicate ID:</b> _____	<b>S.S. howl / spoon</b>
<b>Sampled By:</b> L. Nyland / C.J. Prohaska	<b>MS/MSD:</b> Yes/No <input checked="" type="radio"/> No	<b>Collection Depth Interval:</b> 0-6 in

### SAMPLE CONTAINER SPECIFICATION

Sample Analysis	Number of Containers	Container Type	Sample Volume	Preservative
TCL SVOCs / PCBs / Pest	1 2	8 oz. glass	Fill to Capacity	Cool to 4° C
TAL Metals	1	8 oz. glass	Fill to Capacity	Cool to 4° C
TCL Pesticides <sup>Grown</sup>	1	8 oz. glass	Fill to Capacity	Cool to 4° C
Aroclors / PCBs <sup>Toxicity</sup>	1 2	8 oz. glass	Fill to Capacity	Cool to 4° C

1/2 Gallon Poly

### SEDIMENT OBSERVATIONS

**Sediment Description:** (Color, Sand, Silt, Clay, etc.)

Grey clay mixed w/ some organic matter.

Depth ~ 5.0 ft

*[Signature]*

---

**Photo Number / Description:** (Include direction)

No photo

*[Signature]*





### SEDIMENT SAMPLING LOG

SITE NAME: Smokey Mountain Smelters	SITE LOCATION: Knoxville, Tennessee	DATE: 4/17/2012
SAMPLE LOCATION: SMSSD18	RECORDED BY: Linda Myland	
WEATHER CONDITIONS: overcast / 70's		

### SEDIMENT DATA

Sample ID: SMSSD18	Duplicate: Yes/No <input checked="" type="checkbox"/>	Collection Method: S.S. auger / bowls / spoons
Sample Time: 1230	Duplicate ID: _____	Collection Depth Interval: 0-6 in - 0-3 in
Sampled By: L. Myland / C. Rockwell	MS/MSD: Yes/No <input checked="" type="checkbox"/>	

### SAMPLE CONTAINER SPECIFICATION

Sample Analysis	Number of Containers	Container Type	Sample Volume	Preservative
TCL SVOCs / PCBs / Pest	2	8 oz. glass	Fill to Capacity	Cool to 4° C
TAL Metals	1	8 oz. glass	Fill to Capacity	Cool to 4° C
TCL Pesticides (Grain)	1	8 oz. glass	Fill to Capacity	Cool to 4° C
ATOCs/PCBs Toxicity	2	8 oz. glass	Fill to Capacity	Cool to 4° C

NO 1/2 Gal Poly

### SEDIMENT OBSERVATIONS

Sediment Description: (Color, Sand, Silt, Clay, etc.)

Grey clay, some organic matter  
Depth ~ 3.5 ft

gravel

Photo Number / Description: (Include direction)

No photo

gravel



# **SEDIMENT SAMPLING LOG**

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 4/17/2012
<b>SAMPLE LOCATION:</b> SMS5011		<b>RECORDED BY:</b> L. Nyland
<b>WEATHER CONDITIONS:</b> Overcast / 70's		

## **SEDIMENT DATA**

<b>Sample ID:</b> SMS5011	<b>Duplicate:</b> Yes/No <input checked="" type="radio"/> No	<b>Collection Method:</b> Stainless steel Scoop / bowl / spoon
<b>Sample Time:</b> 1415	<b>Duplicate ID:</b> _____	<b>Collection Depth Interval:</b> 0-3 IN
<b>Sampled By:</b> L. Nyland / C. Roebuck MS/MSD: <input checked="" type="radio"/> Yes <input type="radio"/> No		

## **SAMPLE CONTAINER SPECIFICATION**

Sample Analysis	Number of Containers	Container Type	Sample Volume	Preservative
TCL SVOCs / PCBs / Pest	1/2	8 oz. glass	Fill to Capacity	Cool to 4° C
TAL Metals	1	8 oz. glass	Fill to Capacity	Cool to 4° C
TCL Pesticides - Gravel	1	8 oz. glass	Fill to Capacity	Cool to 4° C
Aroclors/PCBs - Toxicity	1/2	8 oz. glass	Fill to Capacity	Cool to 4° C

1/2 Gal. HDPE

## **SEDIMENT OBSERVATIONS**

**Sediment Description:** (Color, Sand, Silt, Clay, etc.)

Gray clay Silty sand w/ some gravel. some clay.

*[Signature]*

**Photo Number / Description:** (Include direction)

Photo# DSCN0439, facing South. CJ Roebuck (JMWaller) rings sampling equipment after collection of SMS5011. Facing downstream to SMS5011, post sample collection. Time: 1454, photographer: Linda Nyland (JMWaller)

Photo# DSCN0440, facing SE, CJ Roebuck near sample location SMS5011. Time: 1455. Photographer: Linda Nyland (JMWaller)

*[Signature]*



# SEDIMENT SAMPLING LOG

SITE NAME: Smokey Mountain Smelters	SITE LOCATION: Knoxville, Tennessee	DATE: 4/17/2012
SAMPLE LOCATION: SMSSDSW04	RECORDED BY: Linda Nyland	
WEATHER CONDITIONS: overcast / 80's		

## SEDIMENT DATA

Sample ID: SMSSD04	Duplicate: <input checked="" type="radio"/> Yes <input type="radio"/> No	Collection Method: S.S. Scoop / bowl / spoon
Sample Time: 1730-1815 <sup>hr</sup>	Duplicate ID: SMSSD904 1815	Collection Depth Interval: 0-3
Sampled By: L. Nyland	MS/MSD: Yes <input checked="" type="radio"/> No <input type="radio"/>	

## SAMPLE CONTAINER SPECIFICATION

Sample Analysis	Number of Containers	Container Type	Sample Volume	Preservative
TCL SVOCs, PCBs / Pst	2	8 oz. glass	Fill to Capacity	Cool to 4° C
TAL Metals	1	8 oz. glass	Fill to Capacity	Cool to 4° C
TCL Pesticides (Carin)	1	8 oz. glass	Fill to Capacity	Cool to 4° C
Aroclors/PCBs Toxicity	2	8 oz. glass	Fill to Capacity	Cool to 4° C

1/2 Gal HDPE

## SEDIMENT OBSERVATIONS

Sediment Description: (Color, Sand, Silt, Clay, etc.)

Some silty clay w/ well graded sand.  
 Note: upstream ~ 300ft an area of clearing w/ "dirt work" has occurred. This location shows erosion into creek - although a silt fence was evident in brush near stream.

Photo Number / Description: (Include direction)

Photo# DSCN0444, facing ~~East, Northeast~~<sup>South</sup> Southeast, sample location SMSSD04, after sample was collected. Time: 1837. Photographer: L. Nyland  
 Photo# DSCN0445, facing NE at SMSSD04 (after sample collection) w/ rug and culvert in background. Time: 1837. Photographer: L. Nyland  
 Note: Photos DSCN0441 to DSCN0443 - Not pertinent to sample collected - but of path cleared through brush to access SMSSD04.

*[Signature]*



# **SEDIMENT SAMPLING LOG**

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b>
<b>SAMPLE LOCATION:</b>		<b>RECORDED BY:</b>
<b>WEATHER CONDITIONS:</b>		

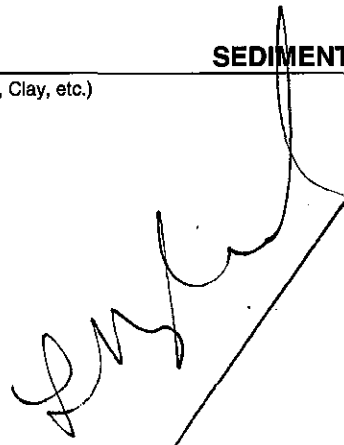
## **SEDIMENT DATA**

Sample ID:	Duplicate: Yes/ No	Collection Method:
Sample Time:	Duplicate ID: _____	Collection Depth Interval:
Sampled By:	MS/MSD: Yes/ No	

## **SAMPLE CONTAINER SPECIFICATION**

Sample Analysis	Number of Containers	Container Type	Sample Volume	Preservative
TCL SVOCs	1	8 oz. glass	Fill to Capacity	Cool to 4° C
TAL Metals	1	8 oz. glass	Fill to Capacity	Cool to 4° C
TCL Pesticides	1	8 oz. glass	Fill to Capacity	Cool to 4° C
Aroclors/PCBs	1	8 oz. glass	Fill to Capacity	Cool to 4° C

## **SEDIMENT OBSERVATIONS**

<p>Sediment Description: (Color, Sand, Silt, Clay, etc.)</p> 
<p>Photo Number / Description: (Include direction)</p>



## SEDIMENT SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b>
<b>SAMPLE LOCATION:</b>		<b>RECORDED BY:</b>
<b>WEATHER CONDITIONS:</b>		

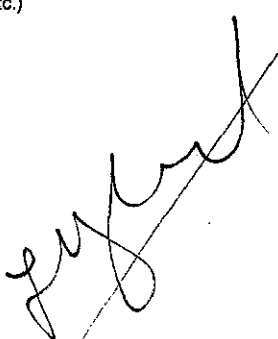
### SEDIMENT DATA

Sample ID:	Duplicate: Yes/ No	Collection Method:
Sample Time:	Duplicate ID: _____	Collection Depth Interval:
Sampled By:	MS/MSD: Yes/ No	

### SAMPLE CONTAINER SPECIFICATION

Sample Analysis	Number of Containers	Container Type	Sample Volume	Preservative
TCL SVOCs	1	8 oz. glass	Fill to Capacity	Cool to 4° C
TAL Metals	1	8 oz. glass	Fill to Capacity	Cool to 4° C
TCL Pesticides	1	8 oz. glass	Fill to Capacity	Cool to 4° C
Aroclors/PCBs	1	8 oz. glass	Fill to Capacity	Cool to 4° C

### SEDIMENT OBSERVATIONS

Sediment Description: (Color, Sand, Silt, Clay, etc.)  
Photo Number / Description: (Include direction)



# Calibration / Bump Log.

Date	Instrument	Serial #	Parameter (Pre)	Parameter (Post)
6/26/12	YSI 556MPS	006769 06H2823 AF	DO % = 97.2 1.413 Conductivity = 1.403 mS/cm pH 7 = 6.98 240 ORP = 235.8	   240.0
	YSI 556MPS	11D102122	DO % = 101.8 1.413 Conduct. = 1.436 pH 7 = 7.03 240 ORP = 233.3	 1.413  240.1
6/27/2012	YSI 556MPS	(006769) 06H2823 AF	DO % = 105.5 1.413 conduct = 1.280 4 pH = 3.97 10 pH = 10.05 240 ORP = 246.4	 1.413   
		11D102122	DO % = 105.1 1.413 cond = 1.295 4 pH = 3.95 10 pH = 10.05 240 ORP = 243.5	 1.413   
6/28/2012	YSI 556MPS	11D102122	DO % = 105.4 1.413 cond = 1.430 4 pH = 4.384 = 4.00 10 pH = 10.21 = 10.00 240 ORP = 242.0	  4.00 10.00 
		06H2823 AF (006769)	DO % = 107.0 1.413 cond = 1.491 = 1.413 4 pH = 3.85 = 4.00 10 pH = 10.22 = 10.00 240 ORP = 248.9 = 240.00	 1.413 4.00 10.00 240.00





MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 6/26/12	
WELL NO: MW10A		SAMPLE ID: SMS MW10A		SAMPLE TIME: 6/27/2012	
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: clear / 70's / Breezy 0820					

Well Type: <b>Flush</b>	Pump (and S/N): <b>S.S. Monsoon # 16017</b>	Total Well Depth (feet): <b>32</b>
Well Diameter (inches): <b>2.0</b>	Water Quality Meter (and S/N): <b>YSI 554 06H2823AF</b>	Screen Interval (feet) <b>22-32</b>
Tubing Diameter (inches): <b>3/16" ID</b>	Turbidity Meter (and S/N): <b>Hach 2100A 11080C011535</b>	Static Depth to Water (feet) <b>25.9</b>
Tubing Material: <b>PTFE TPE</b>	Water Level Indicator (and S/N): <b>Solinst #901867</b>	Tubing Depth <b>29.0</b>
<b>1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity</b> <b>= ( 32 feet - 25.9 feet ) X 0.16 gallons/foot = 0.97 gallons X 3 = 2.93</b>		Volume to be Purged (gallons): <b>2.93</b> Total Volume Purged (gallons): <b>3.50</b>

[illegible]

**Stabilization Criteria Range:** Temperature: + 0.2 °C; Specific Conductance: + 5%; Dissolved Oxygen: + 0.2 mg/L; pH: + 0.1 unit; Turbidity: <10 NTU

Field Filtered: Yes/ No Filter Size: <u>          </u>		Duplicate: Yes/ No Duplicate ID: <u>          </u>		Time: <u>          </u>	MS/MSD: Yes/ No <u>          </u>
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time
TCL VOCs	3	40 mL vials	Fill to Capacity	Cool to 4° C; HCl to pH <2	14 days
TAL Metals + Hg	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
TAL Metals + Hg (filtered)*	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
Nitrate, nitrite, alkalinity, ammonia, chloride, sulfate, phosphate, fluoride	TBD	Polys	TBD	Bottles provided by PEL	
Cyanide	1	1L HDPE	1 L	Cool to 4 ± 2° C, NaOH to pH>12	28 days

Post	PCSS	SVCS	6	1 Lamber	L	Cool to $4^{\circ}\text{C} \pm 2^{\circ}$
------	------	------	---	----------	---	---

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes
Ferrous Iron	Hach 8146	6/27/2012 0835	2.98 mg/L	turbid white
		1		

**SAMPLER(S) SIGNATURE:**

Indenyl / Ithaz



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelters</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>6/26/12</b>
WELL NO: <b>MW10B</b>	SAMPLE ID: <b>SMSMW10B</b>	SAMPLE TIME: <b>1225</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: <b>Clear / 70's / Breezy</b>		

### PURGING DATA

Well Type: <b>Flush</b>	Pump (and S/N): <b>SS Monsoon # 016775</b>	Total Well Depth (feet): <b>70</b>
Well Diameter (inches): <b>2" N</b>	Water Quality Meter (and S/N): <b>YSI 556 110102122</b>	Screen Interval (feet): <b>60-70</b>
Tubing Diameter (inches): <b>3/16" x 1/4"</b>	Turbidity Meter (and S/N): <b>Hach 2100A 110800C011535</b>	Static Depth to Water (feet): <b>25.8</b>
Tubing Material: <b>in PTFE TFE</b>	Water Level Indicator (and S/N): <b>Solinst # 016953</b>	Tubing Depth: <b>~30.0</b>
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = ( <b>70</b> feet - <b>25.8</b> feet ) X <b>0.16</b> gallons/foot = <b>7.07</b> gallons X <b>3</b> = <b>21.21</b>		Volume to be Purged (gallons): <b>21.21</b>
		Total Volume Purged (gallons): <b>21.25</b>

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (ns/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
0935	0.56	0.56	26.40	18.88	1.738	1.68	6.86	227.7	12.4	Clear
0941	1.00	1.56	26.84	18.58	1.718	0.57	6.60	160.2	16.8	Clear
0956	3.00	4.56	26.96	17.54	1.643	0.46	6.49	109.6	11.2	Clear
1021	3.75	8.25	—	18.28	1.683	0.36	6.44	70.5	40.2	Clear
1036	2.25	10.50	26.78	18.68	1.768	0.37	6.41	61.3	11.2	Clear
1101	2.50	13.00	26.55	19.42	1.853	0.30	6.35	40.4	7.00	Clear
1113	1.00	14.00	26.55	19.38	1.869	0.28	6.35	35.3	12.3	Clear
1117	1.00	15.00	26.55	19.55	1.883	0.28	6.33	33.7	4.65	Clear
1130	1.25	16.25	26.55	19.77	1.908	0.27	6.33	29.9	4.22	Clear
1148	2.75	19.00	26.59	19.62	1.927	0.25	6.31	29.8	3.47	Clear
1207	2.00	20.00	26.61	19.88	1.954	0.25	6.30	25.0	1.85	Clear
1219	1.25	21.25	26.61	19.97	1.978	0.25	6.27	21.6	2.41	Clear

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Temperature: ± 0.2 °C; Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L; pH: ± 0.1 unit; Turbidity: <10 NTU

### SAMPLING SUMMARY

Field Filtered: Yes/No <input checked="" type="checkbox"/> No	Duplicate: Yes/No <input checked="" type="checkbox"/> No	Time: <b>12:00</b>			MS/MSD: <input checked="" type="checkbox"/> Yes/No
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time
TCL VOCs	9	40 mL vials	Fill to Capacity	Cool to 4° C; HCl to pH <2	14 days
TAL Metals + Hg	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
<del>TAL Metals + Hg (filtered)</del>	<del>1</del>	<del>1 L HDPE</del>	<del>1 L</del>	<del>Cool to 4 ± 2° C; HNO<sub>3</sub> to pH &lt;2</del>	<del>180 days</del>
Nitrate, nitrite, alkalinity, ammonia, chloride, sulfate, phosphate, fluoride	TBD	Polys	TBD	Bottles provided by PEL	
Cyanide	1	1 L HDPE	1 L	Cool to 4 ± 2° C; NaOH to pH >12	28 days

**PCB/Pest/SVOCs 12 1L Ambros**

### FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes
Ferrous Iron	Hach 8146	6/23/12 1230	0.02 mg/L	

SAMPLER(S) SIGNATURE:

*Linda [Signature] / [Signature]*



# GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelters</b>		SITE LOCATION: <b>Knoxville, Tennessee</b>		DATE: <b>6/26/2012</b>
WELL NO: <b>MW 02A</b>		SAMPLE ID: <b>SMSMW02A</b>		SAMPLE TIME: <b>1530</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: <b>Sunny / 70's / windy</b>				

## PURGING DATA

Well Type: <b>Push</b>	Pump (and S/N): <b>SS Monsoon # 016775</b>	Total Well Depth (feet): <b>27</b>
Well Diameter (inches): <b>2.0</b>	Water Quality Meter (and S/N): <b>YSI 11D102122</b>	Screen Interval (feet): <b>67-27</b>
Tubing Diameter (inches): <b>3/16 x 1/4</b>	Turbidity Meter (and S/N): <b>Hach 110800011535</b>	Static Depth to Water (feet): <b>14.94</b>
Tubing Material: <b>TFE</b>	Water Level Indicator (and S/N): <b>Solinst # 016953</b>	Tubing Depth: <b>~20 ft</b>
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = ( <b>27</b> feet - <b>14.94</b> feet ) X <b>0.16</b> gallons/foot = <b>1.92</b> gallons X <b>3</b> = <b>5.77</b>		Volume to be Purged (gallons): <b>5.77</b> Total Volume Purged (gallons): <b>10.0</b>

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (ms/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1436	0.25	0.25	14.99	26.06	10.43	1.29	9.75	-47.8	67.2	Dark Grey cloudy
1449	3.00	3.25	14.99	18.34	10.13	0.32	9.74	-190.8	89.7	Grey
1458	1.50	4.75	15.05	18.27	10.16	0.30	9.80	-210.9	60.3	clearing
1500	2.0	6.75	14.99	18.51	10.20	0.30	9.79	-185.5	40.5	clearing
1515	—	—	—	—	—	—	—	—	30.5	—
1520	10.00	—	—	—	—	—	—	—	23.4	—
Note: met parameters and volume - continued to purge to achieve lower turbidity. I think I'm done										
1550	Final turbidity at end of sample purge								6.53	—

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Temperature: ± 0.2 °C; Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L; pH: ± 0.1 unit; Turbidity: <10 NTU

## SAMPLING SUMMARY

Field Filtered: Yes/ No Filter Size: <b>  </b>	Duplicate: Yes/ No Duplicate ID: <b>  </b>	Time: <b>  </b>			MS/MSD: Yes/ No <b>  </b>
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time
TCL VOCs	3	40 mL vials	Fill to Capacity	Cool to 4° C; HCl to pH <2	14 days
TAL Metals + Hg	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
TAL Metals + Hg (filtered)*	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
Nitrate, nitrite, alkalinity, ammonia, chloride, sulfate, phosphate, fluoride	TBD	Polys	TBD	Bottles provided by PEL	
Cyanide	1	1L HDPE	1 L	Cool to 4 ± 2° C, NaOH to pH >12	28 days

PCB/Pest/SVOC

6

PL Amber

1L

Cool to 4°C ± 2°C

## FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes
Ferrous Iron	Hach 8146	6/26/12 1545	0.01 mg/L	

SAMPLER(S) SIGNATURE:

*Jurda Nylund / J. Nylund*



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelters</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>6/27/2012</b>
WELL NO: <b>MW01A</b>	SAMPLE ID: <b>SMSMW01A</b>	SAMPLE TIME: <b>1020</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: <b>Sunny / 60S / Breeze</b>		

### PURGING DATA

Well Type: <b>Dush</b>	Pump (and S/N): <b>SS Monsoon 016775</b>	Total Well Depth (feet): <b>40</b>
Well Diameter (inches): <b>2.0</b>	Water Quality Meter (and S/N): <b>YSI 556 0642823 AF</b>	Screen Interval (feet) <b>30-40</b>
Tubing Diameter (inches): <b>3/16 x 1/4</b>	Turbidity Meter (and S/N): <b>Hach 2100 Q 11080014 535</b>	Static Depth to Water (feet) <b>34.47</b>
Tubing Material: <b>TPE</b>	Water Level Indicator (and S/N): <b>Solinst 016953</b>	Tubing Depth <b>36.0</b>

**1 WELL VOLUME PURGE** = (Total Well Depth - Static Depth to Water) X Well Capacity  
 = **(40 feet - 34.47 feet) X 0.16 gallons/foot = 0.88 gallons X 3 = 2.65**

Volume to be Purged (gallons): **2.65**  
 Total Volume Purged (gallons): **4.00**

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (µS/cm or ms/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
0941	0.25	0.25	34.79	19.06	42.28	1.14	6.35	295.4	532	Orange Cloudy
0946	0.50	0.75	34.89	18.81	42.95	0.61	6.30	288.8	234	-
0950	0.25	1.00	34.89	18.93	44.73	0.46	6.33	277.1	156	-
0959	0.50	1.50	34.98	19.60	48.16	0.40	6.35	260.2	81.2	-
1005	0.50	2.00	-	19.15	47.64	0.33	6.33	259.0	69.5	-
1011	0.50	2.50	35.10	19.42	50.10	0.28	6.31	257.4	60.0	-
1016	0.50	3.00	35.20	19.04	48.40	0.33	6.30	265.8	45.2	clearing
1019	0.25	3.25	35.25	18.89	49.43	0.27	6.30	270.8	54.2	-

**Well Capacity (Gal/Ft):** CMT = 0.0106; 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
**Stabilization Criteria Range:** Temperature: ± 0.2 °C; Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L; pH: ± 0.1 unit; Turbidity: <10 NTU

### SAMPLING SUMMARY

Field Filtered: Yes/No Filter Size: 0.45	Duplicate: Yes/No Duplicate ID: SMSMW901A			Time: 1025	MS/MSD: Yes/No
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time
TCL VOCs	3 3	40 mL vials	Fill to Capacity	Cool to 4° C; HCl to pH <2	14 days
TAL Metals + Hg	1 1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO3 to pH <2	180 days
TAL Metals + Hg (filtered)*	1 1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO3 to pH <2	180 days
Nitrate, nitrite, alkalinity, ammonia, chloride, sulfate, phosphate, fluoride	2 <del>10</del> 2	Polys	TBD	Bottles provided by PEL	
Cyanide	1 1	1L HDPE	1 L	Cool to 4 ± 2° C, NaOH to pH>12	28 days

**PCB/Rest/SVOC** 6 6 1L Amber 1L Cool to 4°C ± 2°C

### FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes
Ferrous Iron	Hach 8146	6/27/12 1100	0.09 mg/L	

SAMPLER(S) SIGNATURE:

Linda Ward / J. H. H.



# GROUNDWATER SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 6/27/2002
<b>WELL NO:</b> MW08A	<b>SAMPLE ID:</b> SMSMW08A	<b>SAMPLE TIME:</b> 1409
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b> Sunny / Mid 80's / Breezy		

## PURGING DATA

<b>Well Type:</b> Flush	<b>Pump (and S/N):</b> 30	AS Same as recorded on pg 5 of this book.	<b>Total Well Depth (feet):</b> 35
<b>Well Diameter (inches):</b> 2.0	<b>Water Quality Meter (and S/N):</b>		<b>Screen Interval (feet):</b> 25-35
<b>Tubing Diameter (inches):</b> 3/16 x 1/4	<b>Turbidity Meter (and S/N):</b>		<b>Static Depth to Water (feet):</b> 23.3
<b>Tubing Material:</b> TFE	<b>Water Level Indicator (and S/N):</b>		<b>Tubing Depth:</b> u
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = ( 35 feet - 23.3 feet ) X 0.16 gallons/foot = 1.87 gallons x 3 = 5.61			<b>Volume to be Purged (gallons):</b> 5.61 <b>Total Volume Purged (gallons):</b> 6.50

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (µS/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1331	0.5	0.5	23.80	18.58	8.135	0.41	8.79	114.8	-	Brown Cloudy
1339	1.50	2.00	24.16	18.32	8.132	0.24	8.61	139.6	-	" "
1349	1.50	3.50	24.05	18.82	8.380	0.88	8.69	110.7	659	" "
1355	1.00	4.50	24.15	18.40	8.373	0.17	8.71	90.5	287	" "
1401	1.00	5.50	24.15	18.42	8.461	0.16	8.74	75.8	166	" "
1407	1.00	6.50	24.2	18.42	8.545	0.13	8.78	61.9	102	Clear

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Temperature: ± 0.2 °C; Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L; pH: ± 0.1 unit; Turbidity: <10 NTU

## SAMPLING SUMMARY

Field Filtered: Yes/No Filter Size: 0.45	Duplicate: Yes/No Duplicate ID: 1	Time: /			MS/MSD: Yes/No 1
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time
TCL VOCs	3	40 mL vials	Fill to Capacity	Cool to 4° C; HCl to pH <2	14 days
TAL Metals + Hg	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
TAL Metals + Hg (filtered)*	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
Nitrate, nitrite, alkalinity, ammonia, chloride, sulfate, phosphate, fluoride	TBD	Polys	TBD	Bottles provided by PEL	
Cyanide	1	1L HDPE	1 L	Cool to 4 ± 2° C, NaOH to pH>12	28 days

PCB/PCST/SVOCs 6 1L Amber 1L Cool to 4°C ± 2°C

## FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes
Ferrous Iron	Hach 8146	6/27/02 1420	0.0 mg/L	/

**SAMPLER(S) SIGNATURE:** *[Signature]*



# GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelters</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>6/27/2012</b>
WELL NO: <b>MW04A</b>	SAMPLE ID: <b>SM SMW04A</b>	SAMPLE TIME: <b>1540</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: <b>Sunny / upper 80's / Breeze</b>		

## PURGING DATA

Well Type: <b>Flush</b>	Pump (and S/N):	} Same as recorded on pg 5 of TWS book	Total Well Depth (feet): <b>43</b>
Well Diameter (inches): <b>2.0</b>	Water Quality Meter (and S/N):		Screen Interval (feet) <b>33-43</b>
Tubing Diameter (inches): <b>3/16 x 1/4</b>	Turbidity Meter (and S/N):		Static Depth to Water (feet) <b>38.20</b>
Tubing Material: <b>TFE</b>	Water Level Indicator (and S/N):		Tubing Depth <b>~39.0</b>
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = ( <b>43</b> feet - <b>38.20</b> feet ) X <b>0.16</b> gallons/foot = <b>0.76</b> gallons <b>X3 = 2.30</b>			Volume to be Purged (gallons): <b>2.30</b>
			Total Volume Purged (gallons): <b>2.75</b>

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (ms/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1521	0.75	0.75	38.70	19.02	19.05	0.81	5.63	169.9	467	Orange Cloudy
1525	0.50	1.25	38.90	18.60	19.24	0.54	5.59	184.5	391	
1530	0.00	2.25	39.05	18.55	19.82	0.42	5.64	175.4	179	
1533	0.25	2.50	-	18.65	20.54	0.38	5.64	171.9	107	
1535	0.25	2.75	39.10	18.62	20.84	0.32	5.64	170.1	79.3	

Well Capacity (Gal/Ft): CMT = 0.0106; 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Temperature: ± 0.2 °C; Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L; pH: ± 0.1 unit; Turbidity: <10 NTU

## SAMPLING SUMMARY

Field Filtered: Yes/ No Filter Size: 0.45	Duplicate: Yes/ No Duplicate ID: 0				Time: 1540	MS/MSD: Yes/ No
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time	
TCL VOCs	3	40 mL vials	Fill to Capacity	Cool to 4° C; HCl to pH <2	14 days	
TAL Metals + Hg	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days	
TAL Metals + Hg (filtered)*	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days	
Nitrate, nitrite, alkalinity, ammonia, chloride, sulfate, phosphate, fluoride	TBD 2	Polys	TBD	Bottles provided by PEL		
Cyanide	1	1L HDPE	1 L	Cool to 4 ± 2° C, NaOH to pH>12	28 days	

PCB/Pest/SVOC **6** 1L Amber **1L** Cool to 4°C ± 2°C

## FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes
Ferrous Iron	Hach 8146	6/27/12 1605	0.03 mg/L	

SAMPLER(S) SIGNATURE:

*[Signature]*



# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelters	SITE LOCATION: Knoxville, Tennessee	DATE: 6/28/2012
WELL NO: MW07A	SAMPLE ID: SMS07A	SAMPLE TIME: 0920
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: Sunny / upper 60's - Low 70's /		

## PURGING DATA

Well Type: <b>Flush</b>	Pump (and S/N): <b>SS Monsoon 16 017</b>	Total Well Depth (feet): <b>23</b>
Well Diameter (inches): <b>2.0</b>	Water Quality Meter (and S/N): <b>YSI 556 110102122</b>	Screen Interval (feet) <b>13-23</b>
Tubing Diameter (inches): <b>3/16 x 1/4</b>	Turbidity Meter (and S/N): <b>Hach 21002 110800011535</b>	Static Depth to Water (feet) <b>18.81</b>
Tubing Material: <b>TFE</b>	Water Level Indicator (and S/N): <b>Solinst 901867</b>	Tubing Depth <b>22.422.0</b>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = ( <b>23</b> feet - <b>18.81</b> feet ) X <b>0.16</b> gallons/foot = <b>0.67</b> gallons X <b>3</b> = <b>2.01</b>		Volume to be Purged (gallons): <b>2.01</b> Total Volume Purged (gallons): <b>3.75</b>

[illegible]

Well Capacity (Gal/Ft): CMT = 0.0108; 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Temperature:  $\pm 0.2^{\circ}\text{C}$ ; Specific Conductance:  $\pm 5\%$ ; Dissolved Oxygen:  $\pm 0.2\text{ mg/L}$ ; pH:  $\pm 0.1\text{ unit}$ ; Turbidity:  $<10\text{ NTU}$

## SAMPLING SUMMARY

Field Filtered: <input checked="" type="checkbox"/> Yes/ <input checked="" type="checkbox"/> No Filter Size: <u>0.45</u>	Duplicate: <input checked="" type="checkbox"/> Yes/ <input checked="" type="checkbox"/> No Duplicate ID: _____		Time: <u>                    </u>		MS/MSD: <input checked="" type="checkbox"/> Yes/ <input checked="" type="checkbox"/> No
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time
TCL VOCs	3	40 mL vials	Fill to Capacity	Cool to 4° C; HCl to pH <2	14 days
TAL Metals + Hg	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
TAL Metals + Hg (filtered)*	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
Nitrate, nitrite, alkalinity, ammonia, chloride, sulfate, phosphate, fluoride	TBD	Polys	TBD	Bottles provided by PEL	
Cyanide	1	1L HDPE	1 L	Cool to 4 ± 2° C, NaOH to pH>12	28 days

## FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes
Ferrous Iron	Hach 8146	6/28/12 0943	0.01 mg/L	/

**SAMPLER(S) SIGNATURE:**



# GROUNDWATER SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 6/28/2012
<b>WELL NO:</b> MW07B	<b>SAMPLE ID:</b> SMSMW07B	<b>SAMPLE TIME:</b> 0928
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b> Sunny / upper 60's		

## PURGING DATA

<b>Well Type:</b> Flush	<b>Pump (and S/N):</b> SS Monsoon 016775	<b>Total Well Depth (feet):</b> 40
<b>Well Diameter (inches):</b> 2" N	<b>Water Quality Meter (and S/N):</b> YSI 556 06H2823AF	<b>Screen Interval (feet):</b> 30-40
<b>Tubing Diameter (inches):</b> 3/16 x 1/4	<b>Turbidity Meter (and S/N):</b> Hach 2100Q 11080611535	<b>Static Depth to Water (feet):</b> 20.4
<b>Tubing Material:</b> TFE	<b>Water Level Indicator (and S/N):</b> Solinst 016953	<b>Tubing Depth:</b> ~25.0
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = ( 40 feet - 20.4 feet ) X 0.16 gallons/foot = 3.13 gallons		<b>Volume to be Purged (gallons):</b> 9.40 <b>Total Volume Purged (gallons):</b> 9.50

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (ms/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
0828		0.75	21.10	17.86	95.21	2.38	5.82	243.5	94.0	slightly cloudy
0835	1.25	2.00	21.09	17.70	102.7	0.78	5.74	218.3	83.8	cloudy-orange
0851	2.00	4.00	21.10	18.05	103.1	0.33	5.77	226.4	72.6	clearing
0858	1.00	5.00	21.10	17.82	102.1	0.30	5.77	225.9	42.3	clearing
0904	1.00	6.00	21.10	17.91	102.4	0.26	5.77	234.9	24.6	clearing
0910	1.00	7.00	21.10	17.94	102.3	0.25	5.77	239.1	16.7	
0920	1.00	8.00	21.10	17.97	102.3	0.24	5.79	237.2	12.6	
0927	1.50	9.50	21.10	18.00	102.3	0.23	5.80	229.2	8.65	

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0008; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Temperature: ± 0.2 °C; Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L; pH: ± 0.1 unit; Turbidity: <10 NTU

## SAMPLING SUMMARY

Field Filtered: Yes/No Filter Size: 0.45	Duplicate: Yes/No Duplicate ID: 0	Time: /			MS/MSD: Yes/No 0
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time
TCL VOCs	3	40 mL vials	Fill to Capacity	Cool to 4° C; HCl to pH <2	14 days
TAL Metals + Hg	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
<del>TAL Metals + Hg (filtered)*</del>	<del>1</del>	<del>1 L HDPE</del>	<del>1 L</del>	<del>Cool to 4 ± 2° C; HNO<sub>3</sub> to pH &lt;2</del>	<del>180 days</del>
Nitrate, nitrite, alkalinity, ammonia, chloride, sulfate, phosphate, fluoride	TBD 2	Polys	TBD	Bottles provided by PEL	
Cyanide	1	1L HDPE	1 L	Cool to 4 ± 2° C, NaOH to pH>12	28 days

Pest/PCB/SVOC 6 1L Amber 1L Cool to 4°C ± 2°C

## FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes
Ferrous Iron	Hach 8146	6/28/12 0950	0.00 mg/L	

**SAMPLER(S) SIGNATURE:** *Lucy Yund / J. Hays*



# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelters	SITE LOCATION: Knoxville, Tennessee	DATE: 6/28/2012
WELL NO: MW03B	SAMPLE ID: SMSMW03B	SAMPLE TIME: 1403
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: Sunny / 80's / Breezy		

## PURGING DATA

Well Type: 2" Flush	Pump (and S/N):	same as recorded on pg 9 of this book.	Total Well Depth (feet): 66
Well Diameter (inches): 2" N	Water Quality Meter (and S/N):		Screen Interval (feet) 50-66
Tubing Diameter (inches): 3/16 x 1/4	Turbidity Meter (and S/N):		Static Depth to Water (feet) 35.66
Tubing Material: TPE	Water Level Indicator (and S/N):		Tubing Depth: ~ 64.0
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = (66 feet - 35.66 feet) X 0.16 gallons/foot = 4.85 gallons X 3 = 14.56			Volume to be Purged (gallons): 14.56 Total Volume Purged (gallons): 14.75

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (ms/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1041	0.50	0.50	39.80	18.81	112.9	4.01	5.51	192.8	7800	orange cloudy
1054	0.75	2.25	42.80	19.23	111.5	0.40	5.50	170.0	7800	" "
1120	2.75	5.00	43.80	19.98	115.2	0.26	5.52	179.2	300	clearing
1207	5.25	10.25	43.80	19.08	113.2	0.24	5.49	170.4	418	cloudy
1216	0.75	11.00	43.80	19.19	113.3	0.17	5.50	154.5	172	clearing
1342		12.50	1230 - 1330 Lunch. Turned off pump.							
1342	1.5	12.50	39.75	18.87	111.4	0.89	5.52	169.1	67.6	grayish sludgy cloudy
1347	0.75	13.25	39.75	19.01	112.3	0.43	5.47	173.3	51.3	" "
1352	0.50	13.75	41.05	19.33	113.4	0.30	5.49	171.8	44.2	" "
1355	0.25	14.00	41.12	19.35	113.5	0.27	5.48	169.0		
1400	0.75	14.75	41.12	19.39	113.6	0.25	5.48	166.7	28.6	

Well Capacity (Gal/Ft): CMT = 0.0108, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Temperature: ± 0.2 °C; Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L; pH: ± 0.1 unit; Turbidity: <10 NTU

## SAMPLING SUMMARY

Field Filtered: Yes/No Filter Size: 0.45	Duplicate: Yes/No Duplicate ID: SMSMW03B	Time: 1405	MS/MSD: Yes/No		
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time
TCL VOCs	3	40 mL vials	Fill to Capacity	Cool to 4° C; HCl to pH <2	14 days
TAL Metals + Hg	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
TAL Metals + Hg (filtered)*	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
Nitrate, nitrite, alkalinity, ammonia, chloride, sulfate, phosphate, fluoride	TBD 2	Polys	TBD	Bottles provided by PEL	
Cyanide	1	1 L HDPE	1 L	Cool to 4 ± 2° C, NaOH to pH >12	28 days

PCB/Pest/SVOC

6

1L Amber

1L

Cool to 4°C ± 2°C

## FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes
Ferrous Iron	Hach 8146	6/28/12 1425	0.38 mg/L	clear sample

SAMPLER(S) SIGNATURE: *[Signature]*





## GROUNDWATER SAMPLING LOG

## PURGING DATA

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or $\mu\text{S/cm}$	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
<del>Not Used Schrag 6/29/12</del>										

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Temperature:  $\pm 0.2^{\circ}\text{C}$ ; Specific Conductance:  $\pm 5\%$ ; Dissolved Oxygen:  $\pm 0.2\text{ mg/L}$ ; pH:  $\pm 0.1$  unit; Turbidity:  $<10\text{ NTU}$

## SAMPLING SUMMARY

Field Filtered: Yes/ No Filter Size: _____	Duplicate: Yes/ No Duplicate ID: _____		Time: _____		MS/MSD: Yes/ No
<b>Sample Analysis</b>	<b>Number of Containers</b>	<b>Type of Container</b>	<b>Minimum Sample Volume</b>	<b>Preservation</b>	<b>Holding Time</b>
TCL VOCs	3	40 mL vials	Fill to Capacity	Cool to 4° C; HCl to pH <2	14 days
TAL Metals + Hg	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
TAL Metals + Hg (filtered)*	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
Nitrate, nitrite, alkalinity, ammonia, chloride, sulfate, phosphate, fluoride	TBD	Polys	TBD	Bottles provided by PEL	
Cyanide	1	1L HDPE	1 L	Cool to 4 ± 2° C, NaOH to pH>12	28 days

## FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes
Ferrous Iron	Hach 8146			

Page 11 of 11



**SMOKEY MOUNTAIN SMELTERS**  
**KNOXVILLE, TENNESSEE**

**December 2012**  
**RI/FS Phase 2 Groundwater Re-Sampling Event**

**Groundwater Sampling Log**  
**Book 1 of 1**



**J.M. WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**



12/11/2012

0830 Begin opening wells.

0900 Begin water level readings  
June 2012 readings

✓ MW10A = 29.46	(25.9)
✓ MW10B = 29.41	(25.8)
MW02A = 16.59	(14.96)
MW01A = 36.91	(34.47)
MW03B = 37.77	(35.66)
MW04A = 40.85	(38.20)
✓ MW08A = 26.00	(23.3)
✓ MW07A = 21.47	(18.81)
✓ MW07B = 23.00	(20.4)

### Notes

- 1045 MW07A purged dry.
- 1125 At MW07B (left pump in MW07A, moved all other equipment to MW07B.) Trouble with either pump or control - on phone w/ Pine to troubleshoot. (TC onsite w/ surveyor).
- 1145 Pump is bad. Knoxville pump has a Norson replacement.
- 1515 At MW07B with peristaltic pump. 2nd pump had quite <sup>while filling</sup> during sample bottles ~~Auto~~ (only 1 L filled.) Demob to Pine in Knoxville for replacement equipment.  
CJ Roebuck called Jane Austin for an update.





## GROUNDWATER SAMPLING LOG

## PURGING DATA

[illegible]

## SAMPLING SUMMARY

## FIELD SCREENING SUMMARY

**SAMPLER(S) SIGNATURE:**



# GROUNDWATER SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 12/12/12
<b>WELL NO:</b> MW10B ✓	<b>SAMPLE ID:</b> SMSMW10B ✓	<b>SAMPLE TIME:</b> 1022
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b> Fair / 30's		

## PURGING DATA

<b>Well Type:</b> Flush	<b>Pump (and S/N):</b> SSMONSON 2702 Controls 11529	<b>Total Well Depth (feet):</b> 70
<b>Well Diameter (inches):</b> 2.1N	<b>Water Quality Meter (and S/N):</b> YSI 556 MPS 020845	<b>Screen Interval (feet):</b> 60-70
<b>Tubing Diameter (Inches):</b> 3/16 x 1/4	<b>Turbidity Meter (and S/N):</b> Hach 2100 Q 020134	<b>Static Depth to Water (feet):</b> 29.41
<b>Tubing Material:</b> PTFE	<b>Water Level Indicator (and S/N):</b> Solinst 703747	<b>Tubing Depth w/d screen:</b> pump
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (70 feet - 29.41 feet) X 0.16 gallons/foot = 6.49 gallons		<b>Volume to be Purged (gallons):</b> 19.47 <b>Total Volume Purged (gallons):</b> 5.50

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (ms/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
0905	Pump on									
0913	0.25	0.25	29.70	15.00	1.441	1.82	6.62	204.2	71000	cloudy
0923	0.75	1.00	29.88	15.48	1.599	0.93	6.64	186.4	508	clear
0928	0.50	1.50	29.86	15.61	1.621	0.68	6.59	178.7	187	clear
0933	0.35	1.85	29.80	15.52	1.635	0.75	6.54	172.7	139	clear
0943	0.90	2.75	29.80	15.62	1.689	0.56	6.53	162.0	78.1	A/A
0951	0.50	3.25	29.78	15.60	1.730	0.64	6.50	152.7	49.8	A/A
1005	1.25	4.50	29.79	15.73	1.701	0.42	6.49	143.8	14.3	A/A
1010	0.50	5.00	29.80	15.73	1.789	0.42	6.48	140.4	13.1	A/A
1020	0.50	5.50	29.80	15.85	1.813	0.33	6.46	134.8	8.34	clear

**Well Capacity (Gal/Ft):** CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
**Stabilization Criteria Range:** Temperature: ± 0.2 °C; Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L; pH: ± 0.1 unit; Turbidity: <10 NTU

## SAMPLING SUMMARY

<b>Field Filtered:</b> Yes/No Filter Size: 0.45	<b>Duplicate:</b> Yes/No Duplicate ID: SMSMW910B	<b>Time:</b> 1030	<b>MS/MSD:</b> Yes/No		
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time
TCL VOCs	3	40 mL vials	Fill to Capacity	Cool to 4° C; HCl to pH <2	14 days
TAL Metals + Hg	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
TAL Metals + Hg (filtered)*	1	1 L HDPE	1 L	Cool to 4 ± 2° C; HNO <sub>3</sub> to pH <2	180 days
TCL Pest/PCBs	4	1 L Amber glass	4 L	Cool to 4° C	7 days to extract, 40 days to analyze
Cyanide	21	1 L HDPE	1 L	Cool to 4 ± 2° C, NaOH to pH >12	28 days

500 mL

## FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes

**SAMPLER(S) SIGNATURE:** Linda Ryland





SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 12/11/12	
WELL NO: MW07A		SAMPLE ID: SMSMW07A		SAMPLE TIME: 1445	
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: Cloudy / 30's / Slight Breeze					

Well Type: <b>Flush</b>	Pump (and S/N): <b>SS Geosub 20619 (pump)</b>	Total Well Depth (feet): <b>26.0 23.0</b>
Well Diameter (inches): <b>2 in</b>	Water Quality Meter (and S/N): <b>020617 (controller)</b>	Screen Interval (feet): <b>13-23</b>
Tubing Diameter (inches): <b>3/16 x 1/4</b>	Turbidity Meter (and S/N): <b>Hach 2100P 01359</b>	Static Depth to Water (feet): <b>21.47</b>
Tubing Material: <b>TFE</b>	Water Level Indicator (and S/N): <b>Solinst 903747</b>	Tubing Depth: <b>Pump ~ 22.0</b>
<b>1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity</b> <b>= ( 23 feet - 21.47 feet ) X 0.16 gallons/foot = 0.24 gallons X 3 = 0.73</b>		Volume to be Purged (gallons): <b>0.73</b> Total Volume Purged (gallons):

**Well Capacity (Gal/Ft):** CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
**Stabilization Criteria Range:** Temperature:  $\pm 0.2^{\circ}\text{C}$ ; Specific Conductance:  $\pm 5\%$ ; Dissolved Oxygen:  $\pm 0.2\text{ mg/L}$ ; pH:  $\pm 0.1$  unit; Turbidity:  $<10\text{ NTU}$

Field Filtered: Yes/No Filter Size: <u>0.45</u>	Duplicate: Yes/No Duplicate ID: <u>0</u>	Time: <u>1445</u>		MS/MSD: Yes/No <u>0</u>	
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time
TCL Pest/PCBs	<u>12</u>	1 L Amber glass	<u>4x2L</u>	Cool to 4° C	7 days to extract, 40 days to analyze

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes

SAMPLER(S) SIGNATURE: Smela-Nylund





MANAGING THE VISION® ENVIRONMENTAL | FACILITIES | LOGISTICS

Lowflow 2  
midgreen

## PURGING DATA

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1159	Pump on	0.25	23.16	16.19	106.3	1.12	5.99	153.4	71000	Orange Cloudy
1207	0.25	0.50	—	16.54	108.7	0.92	5.96	147.9	44.9	"
1213	0.65	1.15	23.26	16.59	109.9	0.56	5.94	142.3	—	Start to clear
1217	0.35	1.50	23.28	16.84	109.8	0.52	5.95	139.6	—	" "
1221	0.35	1.85	23.28	16.75	109.7	0.40	5.97	136.8	98.3	" "
1225	0.40	2.25	23.30	16.77	109.4	0.41	5.98	134.5	72.7	Clearing Little
1231	0.75	3.00	23.30	16.79	109.2	0.48	5.99	133.9	38.9	" "
1234	0.25	3.25	23.30	16.74	109.2	0.38	5.98	132.6	24.7	" "
1240	0.56	3.75	23.30	16.66	108.8	0.34	5.98	129.8	15.2	" "
1537	Pump on w/ SS	monsoon pump	mid screen	u 35 ft.						
1845	5.10	1.35	23.50	16.73	109.1	0.66	5.97	139.9	459	Cloudy
1549	6.85	1.75	23.21	16.64	109.0	0.54	5.99	136.5	210	Clearing slightly
1553	—	2.00	23.21	16.40	109.1	0.54	6.00	132.7	150	Clearing

Well Capacity (Gal/Ft): CMT = 0.0106; 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Temperature:  $\pm 0.2^{\circ}\text{C}$ ; Specific Conductance:  $\pm 5\%$ ; Dissolved Oxygen:  $\pm 0.2\text{ mg/L}$ ; pH:  $\pm 0.1\text{ unit}$ ; Turbidity:  $<10\text{ NTU}$

Field Filtered: Yes/No <u>0/0</u> Filter Size: <u>0.45</u>		Duplicate: Yes/No <u>0</u> Duplicate ID: _____			Time: <u>—</u>	MS/MSD: <u>2</u> Yes/No
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time	
TCL Pest/POBs	2	1 L Amber glass	12	Cool to 4° C	7 days to extract, 40 days to analyze	
	+ 2 MS/MSD		4 total			

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes

Linda Ryland



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelters</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>12/12/12</b>
WELL NO: <b>MW08A</b>	SAMPLE ID: <b>SM SMW08A</b>	SAMPLE TIME: <b>1543</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: <b>overcast / 30's / Breezy</b>		

### PURGING DATA

Well Type: <b>Flush</b>	Pump (and S/N):	<i>same as recorded in pgs 3 &amp; 4 of the book</i>	Total Well Depth (feet): <b>35.00</b>
Well Diameter (inches): <b>2 in</b>	Water Quality Meter (and S/N):		Screen Interval (feet): <b>25-35</b>
Tubing Diameter (inches): <b>3/16 x 1/4</b>	Turbidity Meter (and S/N):		Static Depth to Water (feet): <b>26.00</b>
Tubing Material: <b>PTFE</b>	Water Level Indicator (and S/N):		Tubing Depth - <b>m.d screen</b> Pump
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = <b>(35 feet - 26 feet) X 0.16 gallons/foot = 1.44 gallons</b>			Volume to be Purged (gallons): <b>4.32</b> <i>To stabilize in mid screen</i> Total Volume Purged (gallons): <b>7.75</b>

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (µS/cm or mS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1402	Pump on									
1413	0.25	0.25	26.04	17.13	7.743	0.92	8.85	86.2	345	orange & cloudy
1423	0.50	0.75	26.09	16.50	7.857	1.10	8.83	70.1	314	A/A
1427	0.50	1.25	24.12	17.62	7.862	0.45	8.84	62.3	461	A/A
1438	1.25	2.50	26.30	17.46	7.950	0.59	8.84	51.8	975	A/A
1452	2.50	5.00	26.60	17.83	7.950	0.29	8.83	33.7	991	A/A
1504	0.50	5.50	26.10	14.22	8.057	0.35	8.85	27.9	710	A/A
1511	0.50	6.00	26.10	17.30	8.049	0.45	8.85	23.5	71000	A/A
1534	0.50	6.50	26.00	17.21	8.195	0.89	8.87	27.3	815	A/A
1537	0.25	6.75	26.00	17.37	8.117	0.77	8.85	26.5	865	A/A
1541	0.50	7.25	26.00	17.70	8.073	0.50	8.85	21.2	71000	A/A

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Temperature: ± 0.2 °C; Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L, pH: ± 0.1 unit; Turbidity: <10 NTU

### SAMPLING SUMMARY

Field Filtered: Yes/No <input checked="" type="checkbox"/>	Duplicate: Yes/No <input checked="" type="checkbox"/>	Time:			MS/MSD: Yes/No <input checked="" type="checkbox"/>		
Filter Size:	Duplicate ID:	Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time
		TCL Pest/POBs	2	1 L Amber glass	2 L	Cool to 4° C	7 days to extract, 40 days to analyze

### FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes

SAMPLER(S) SIGNATURE:

[Signature]



# GROUNDWATER SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 12/13/12
<b>WELL NO:</b> MW 04A	<b>SAMPLE ID:</b> SMSMW04A	<b>SAMPLE TIME:</b> 0859
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b> Clear / upper 20s		

## PURGING DATA

<b>Well Type:</b> Flush	<b>Pump (and S/N):</b>	Sample as recorded on pg 3 of the book	<b>Total Well Depth (feet):</b> 43
<b>Well Diameter (inches):</b> 2.0N	<b>Water Quality Meter (and S/N):</b>		<b>Screen Interval (feet):</b>
<b>Tubing Diameter (inches):</b> 3/16 x 1/4	<b>Turbidity Meter (and S/N):</b>		<b>Static Depth to Water (feet):</b> 40.8
<b>Tubing Material:</b> PTFE	<b>Water Level Indicator (and S/N):</b>		<b>Tubing Depth:</b> ~ 41.0
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = ( 43 feet - 40.5 feet ) X 0.16 gallons/foot = 0.4 x 31.2 gallons To Stabilize			<b>Volume to be Purged (gallons):</b> 1.2 <b>Total Volume Purged (gallons):</b> 2.25

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (ms/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1600	Begin									
0830	Pump on									
0838	0.25	0.25	—	16.68	15.12	2.05	5.93	225.5	7100	light brown
0841	0.25	0.50	—	16.94	15.14	2.61	5.96	222.1	7100	A/A
0849	0.75	1.25	—	17.92	15.57	1.43	5.90	217.8	7100	A/A
0852	0.50	1.75	—	17.73	16.16	1.01	5.89	218.3	948	A/A
0855	0.25	2.00	—	17.75	16.50	1.24	5.88	218.4	433	A/A
0857	0.25	2.25	—	17.97	16.81	1.10	5.88	217.8	236	A/A

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Temperature: ± 0.2 °C; Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L; pH: ± 0.1 unit; Turbidity: <10 NTU

## SAMPLING SUMMARY

<b>Field Filtered:</b> Yes/No	<b>Duplicate:</b> Yes/No	<b>Time:</b>			<b>MS/MSD:</b> Yes/No
<b>Filter Size:</b>	<b>Duplicate ID:</b>				
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time
TCL Pest/PCBs	12	1 L Amber glass	2L	Cool to 4° C	7 days to extract, 40 days to analyze

## FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes

**SAMPLER(S) SIGNATURE:**

*Lincoln*



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelters</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>12/13/12</b>
WELL NO: <b>MW03B</b>	SAMPLE ID: <b>SM5MW03B</b>	SAMPLE TIME: <b>1115</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: <b>Sunny / 30's</b>		

### PURGING DATA

Well Type: <b>Plush</b>	Pump (and S/N): <b>Same as recorded on pg 3 of this book</b>	Total Well Depth (feet): <b>136</b>
Well Diameter (inches): <b>2" N</b>	Water Quality Meter (and S/N):	Screen Interval (feet):
Tubing Diameter (inches): <b>3/16 x 1/4</b>	Turbidity Meter (and S/N):	Static Depth to Water (feet): <b>37.77</b>
Tubing Material: <b>PTFE</b>	Water Level Indicator (and S/N):	Tubing Depth: <b>~ 101 ft</b>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = <b>(136 feet - 37.77 feet) X 0.16 gallons/foot = 4.51 (13.55) gallons</b> <i>To stabilize</i>		Volume to be Purged (gallons): <b>To stabilize</b> Total Volume Purged (gallons): <b>13.55</b>

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (ms/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
0923	Pump on									
0931	0.25	0.25	39.63	16.40	115.3	1.29	5.53	280.6	71000	Light Beige
0939	0.50	0.75	40.25	16.40	114.5	1.24	5.54	330.3	71000	A/A
0944	0.25	1.00	-	16.69	114.6	1.01	5.54	222.8	764	A/A
1024	4.00	5.00	52.14	19.15	109.9	0.41	5.62	45.0	46.8	A/A
1039	3.25	8.25	52.95	18.88	111.6	0.31	5.56	29.6	212	Light Beige
1048	1.75	10.00	53.30	18.74	111.7	0.30	5.55	28.7	-	A/A
1055	0.75	10.75	51.70	18.47	111.0	0.37	5.55	33.7	150	A/A
1103	1.0	11.75	52.90	18.95	112.1	0.30	5.54	37.6	154	A/A
1108	1.25	13.00	53.1	18.65	112.8	0.29	5.53	41.3	108	A/A
1112	0.55	13.55	53.0	18.63	112.9	0.29	5.53	42.8	100	A/A

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Temperature: ± 0.2 °C; Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L, pH: ± 0.1 unit; Turbidity: <10 NTU

### SAMPLING SUMMARY

Field Filtered: Yes/No <b>No</b>		Duplicate: Yes/No <b>No</b>		Time:		MS/MSD: Yes/No <b>No</b>	
Filter Size:		Duplicate ID:					
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time		
TCL Pest/PCBs	2	1 L Amber glass	2L	Cool to 4° C	7 days to extract, 40 days to analyze		

### FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes

SAMPLER(S) SIGNATURE:



# GROUNDWATER SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 12/13/12
<b>WELL NO:</b> MW02A	<b>SAMPLE ID:</b> SMSMW02A	<b>SAMPLE TIME:</b> 1349
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b> Sunny / 50's / Slight Breeze		

## PURGING DATA

<b>Well Type:</b> Push	<b>Pump (and S/N):</b> Same as recorded on pg 3 of this book	<b>Total Well Depth (feet):</b> 27
<b>Well Diameter (inches):</b> 2" N	<b>Water Quality Meter (and S/N):</b>	<b>Screen Interval (feet):</b> 17-27
<b>Tubing Diameter (inches):</b> 3/16 x 1/4	<b>Turbidity Meter (and S/N):</b>	<b>Static Depth to Water (feet):</b> 16.55
<b>Tubing Material:</b> PTFE	<b>Water Level Indicator (and S/N):</b>	<b>Tubing Depth:</b> ~22
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (27 feet - 16.55 feet) X 0.16 gallons/foot = 1.67 x 3 = 5.01 gallons		<b>Volume to be Purged (gallons):</b> 5.01 <b>Total Volume Purged (gallons):</b> 5.00

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (µS/cm or ms/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1300	Pump on									
1305	0.50	0.50	16.54	19.51	10.82	0.63	9.80	-57.4	125	Light Breeze
1309	0.25	0.75	16.55	19.48	10.68	0.38	9.76	-81.5	131	A/A
1318	1.25	2.00	16.55	19.47	10.59	0.17	9.77	-184.5	56.8	A/A
1327	1.00	3.00	16.55	19.58	10.60	0.11	9.76	-237.9	20.5	A/A
1337	1.00	4.00	16.55	19.45	10.62	0.09	9.76	-212.7	11.0	A/A
1347	1.00	5.00	16.55	19.36	10.65	0.12	9.75	-283.1	7.94	A/A

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Temperature: ± 0.2 °C; Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L, pH: ± 0.1 unit; Turbidity: <10 NTU

## SAMPLING SUMMARY

Field Filtered: Yes/No <input checked="" type="checkbox"/> No Filter Size: _____	Duplicate: Yes/No <input checked="" type="checkbox"/> No Duplicate ID: _____	Time: _____			MS/MSD: Yes/No <input checked="" type="checkbox"/> No
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time
TCL Pest/PCBs	12	1 L Amber glass	4 L	Cool to 4° C	7 days to extract, 40 days to analyze

## FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes

**SAMPLER(S) SIGNATURE:**



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelters</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>12/13/12</b>
WELL NO: <b>MW01A</b>	SAMPLE ID: <b>SMSMW01A</b>	SAMPLE TIME: <b>1445</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: <b>Sunny / 50's.</b>		

### PURGING DATA

Well Type: <b>Flush</b>	Pump (and S/N):	Same as recorded on pg 3 of this book.	Total Well Depth (feet): <b>40</b>
Well Diameter (inches): <b>2 in</b>	Water Quality Meter (and S/N):		Screen Interval (feet): <b>30.40</b>
Tubing Diameter (inches): <b>3/16 x 1/4</b>	Turbidity Meter (and S/N):		Static Depth to Water (feet): <b>36.91</b>
Tubing Material: <b>PTE</b>	Water Level Indicator (and S/N):		Tubing Depth: <b>235 (w/ screen)</b>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = <b>40</b> feet - <b>36.91</b> feet X <b>0.14</b> gallons/foot = <b>0.49</b> gallons			Volume to be Purged (gallons): <b>1.48 - to stable</b> Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (ms/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
<b>1407</b>	<b>Pump on</b>									
<b>1412</b>	<b>0.50</b>	<b>0.50</b>	<b>37.20</b>	<b>17.13</b>	<b>58.42</b>	<b>0.88</b>	<b>6.45</b>	<b>56.5</b>	<b>7100 U</b>	<b>Light Brown</b>
<b>1417</b>	<b>0.25</b>	<b>0.75</b>	<b>37.24</b>	<b>17.76</b>	<b>57.59</b>	<b>0.72</b>	<b>6.45</b>	<b>66.5</b>	<b>7100 U</b>	<b>A/A</b>
<b>1422</b>	<b>0.25</b>	<b>1.00</b>	<b>37.29</b>	<b>18.30</b>	<b>57.15</b>	<b>0.57</b>	<b>6.48</b>	<b>68.8</b>	<b>262</b>	<b>A/A</b>
<b>1428</b>	<b>0.50</b>	<b>1.50</b>	<b>37.40</b>	<b>18.54</b>	<b>57.10</b>	<b>0.48</b>	<b>6.46</b>	<b>71.4</b>	<b>145</b>	<b>A/A</b>
<b>1443</b>	<b>1.50</b>	<b>3.00</b>	<b>37.40</b>	<b>18.59</b>	<b>55.81</b>	<b>0.37</b>	<b>6.46</b>	<b>71.7</b>	<b>57.3</b>	<b>A/A</b>

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Temperature: ± 0.2 °C; Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L; pH: ± 0.1 unit; Turbidity: <10 NTU

### SAMPLING SUMMARY

Field Filtered: Yes/ No	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No	
Filter Size:					
Sample Analysis	Number of Containers	Type of Container	Minimum Sample Volume	Preservation	Holding Time
<b>TCL Pest/PCBs</b>	<b>42</b>	<b>1 L Amber glass</b>	<b>12 L</b>	<b>Cool to 4° C</b>	<b>7 days to extract, 40 days to analyze</b>

### FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes

SAMPLER(S) SIGNATURE:

[Signature]





# GROUNDWATER SAMPLING LOG

PREPARING THE VISION   ENVIRONMENTAL FACILITIES   LOGISTICS <b>GROUNDWATER FORM ENG-001</b>		
<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b>
<b>WELL NO:</b>	<b>SAMPLE ID:</b>	<b>SAMPLE TIME:</b>
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b>		

## PURGING DATA

Well Type:	Pump (and S/N):	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter (and S/N):	Screen Interval (feet)
Tubing Diameter (inches):	Turbidity Meter (and S/N):	Static Depth to Water (feet)
Tubing Material:	Water Level Indicator (and S/N):	Tubing Depth
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                      feet –                      feet) X                      gallons/foot =                      gallons		Volume to be Purged (gallons):  Total Volume Purged (gallons):

[illegible]

**Well Capacity (Gal/Ft):** CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
**Stabilization Criteria Range:** Temperature: +0.2°C; Specific Conductance: +5%; Dissolved Oxygen: +0.2 mg/L, pH: +0.1 unit; Turbidity: <10 NTU

## SAMPLING SUMMARY

Field Filtered: Yes/ No Filter Size: _____	Duplicate: Yes/ No Duplicate ID: _____ Time: _____				MS/MSD: Yes/ No
<b>Sample Analysis</b>	<b>Number of Containers</b>	<b>Type of Container</b>	<b>Minimum Sample Volume</b>	<b>Preservation</b>	<b>Holding Time</b>
TCL Pest/PCBs	4	1 L Amber glass	4 L	Cool to 4° C	7 days to extract, 40 days to analyze

## FIELD SCREENING SUMMARY

Sample Analysis	Method	Date/ Time of Analysis	Results	Notes

**SAMPLER(S) SIGNATURE:**





MANAGING THE VISION | ENVIRONMENTAL | FACILITIES | LOGISTICS

## INSTRUMENT AND CALIBRATION LOG

Site Name: Smokey Mountain Smelter

Instrument Readings					Instrument		
Calibration Date	Parameter Calibrating	Calibration Value	End of Day Bump Test	Signature	Type	Manufacturer	Line # Serial Number
12/11/12	D.O. %	122.5 → 97.4	✓	<i>[Signature]</i>	Water Quality	YSI 556 MPS	020865
	DO mg/L	14.12 → 11.23					
	conductivity	1.413 → 1.413					
	pH 4	→ 4.02					
	pH 7	→ 7.01					
	ORP	→ 253					
12/12/12	DO %	93.6		<i>[Signature]</i>			
	DO mg/L	12.48					
	cond.	1.549					
	pH 4	3.99					
	pH 7	7.04					
	ORP	244					
	100 NTU	101			Turbidity	Hach 2100 Q	020134
	20 NTU	20.3					
	10 NTU	10.0					
12/1/13	DO %	93.7		<i>[Signature]</i>	Water Quality	YSI 556 MPS	020865
	DO mg/L	11.14					
	cond.	1.413					
	pH 4	4.08					
	pH 7	7.08					
	ORP	243.2					
	100 NTU	101			Turbidity	Hach 2100 Q	020134
	20 NTU	20.1					
	10 NTU	10.1					



# Smoky Mountain Smelters New Monitor Wells onsite

	<u>dtw (b to c)</u>	<u>TD</u>	<u>3 Vol</u>	<u>Recommended will draw flow rate - down</u>
✓ MW01A ~ 33		46'	6.5g	~ 0.5-0.75 gpm
✓ MW02A ~ 14.5		46'	15g	1-2 gpm
MW03B ~ 51'		66'	7.5	0.5 gpm
MW04A ~ 35?		43'	4.0	0.5 gpm
MW07A ~ 17		23'	2.5	0.75-1.0 gpm
MW07B ~ 19.3		40'	10	1-1.5 gpm
MW08A ~ 22.1		37.5	8+	0.75 gpm
MW10A ~ 26		32	3g	< 0.5
MW10B ~ 23.3		70	24g	1.5

	<u>TD</u>	<u>12/12 water level</u>	<u>ft water</u>	<u>3 vol</u>
MW10 A	32	29.46	2.5'	0.40
10B	70	29.41	40.5'	~ 20g
2A	27	16.59	10.4'	~ 5.2g
1A	40	36.91	3.1'	~ 1.5g
3B	66	37.77	28.8'	14.4g
4A	43	40.85	2.15'	1.07g
8A	35	26	9.0'	4.5g



**SMOKEY MOUNTAIN SMELTERS**  
Knoxville, Knox County, Tennessee

**June 2013**

**Field Event 3**

**Remedial Investigation / Feasibility Study**

**Groundwater Sampling Log**

**Book 1 of 2**



**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**



June 3, 2013 Water levels

MW-12B 30.29

MW-12A 30.48

MW-13A 20.10

MW-13B 25.79

MW-10A 18.51

MW-10B 18.04

MW-02A 14.05

MW-01A 28.94

MW-03B 31.75

MW-04A 34.41

MW-08A 20.01

MW-07B 16.48

MW-07A 14.75

MW-11A 3.58

MW-11B 5.64





MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS

Site Name: Smoker, Man Smelters

20





J.M. WALLER  
ASSOCIATES, INC.

MANAGING THE VISION: ENVIRONMENTAL | FACILITIES | LOGISTICS

## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>03 JUN 13</b>
WELL NO: <b>MW-12A</b>	SAMPLE ID: <b>MW-12A</b>	SAMPLE TIME: <b>1320</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: <b>Partly Cloudy / 70's / Breezy</b>		

### PURGING DATA

Well Type: <b>5" C/40 PVC</b>	Pump: (S/N): <b>650002 S.B. MCAS 18 LF GS0002 (AIR)</b>	Total Well Depth (feet): <b>~39-40</b>
Well Diameter (inches): <b>2.0 ID</b>	Water Quality Meter: (S/N): <b>YS1556 MP5 #1249 (PINK)</b>	Screen Interval (feet): <b>15 ft</b>
Tubing Diameter (inches): <b>3/16 ID x 0.250D</b>	Turbidity Meter: (S/N): <b>HAN/2100 9 (PINK) 2.403</b>	Static Depth to Water (feet):
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>HAN/011000-T #107450 (PINK)</b>	Tubing Depth (Begin/End): <b>~35 ft</b>

**1 WELL VOLUME PURGE** = (Total Well Depth - Static Depth to Water) X Well Capacity  
 = (        feet -        feet ) X        gallons/foot =        gallons

**Purge Method:** Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")

Volume to be Purged (gallons): **TO STABLE**  
 Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance $\frac{ms}{cm}$ or $\frac{\mu S}{cm}$	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1128	0.5	0.5	31.65	18.15	2.253	6.01	5.83	132.1	29.5	None/None
1145	0.25	0.75	30.96	20.31	2.282	6.16	6.17	97.0	11.3	
1201	0.25	1	31.02	19.11	2.285	6.26	6.05	115.6	7.60	
1221	0.2	1.2	31.06	19.81	2.272	5.75	6.08	127.1	5.16	
1235	0.2	1.4	31.08	20.04	2.262	5.30	6.11	127.2	4.92	
1255	0.1	1.5	31.09	19.64	2.265	5.33	6.12	125.3		
1315	0.3	1.8	31.08	19.47	2.278	5.48	6.15	127.0	2.29	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance:  $\pm 5\%$ ; Dissolved Oxygen:  $\pm 0.2$  mg/L or 10% saturation, pH:  $\pm 0.1$  unit; Turbidity:  $<10$  NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
-------------------------	--------------------	--------------------	---------------------	-------------	-----------------

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

**EFFLUENT EFFLUENTING AT SURFACE / PUMP OUTFALL**

SAMPLER(S) SIGNATURE: \_\_\_\_\_



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>3 Jun 13</b>
WELL NO: <b>SMS MW10A</b>	SAMPLE ID: <b>SMS MW10A</b>	SAMPLE TIME: <b>1550</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Well Type: <b>PVC</b> Well Diameter (inches): <b>2</b> Tubing Diameter (inches): <b>3/16ID x 0.250D</b> Tubing Material: <b>PTFE (Teflon) ✓</b>	Pump: (S/N): <b>Geopump</b> Water Quality Meter: (S/N): <b>Youba U-5000 HGS # UC 4FRFAK</b> Turbidity Meter: (S/N): <b>NONE</b> Water Level Indicator: (S/N): <b>Heron Dipper T 12586</b>	Total Well Depth (feet): <b>32'</b> Screen Interval (feet): <b>22-32</b> Static Depth to Water (feet): <b>18.5'</b> Tubing Depth (Begin/End): <b>~30.5'</b>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet        ) X        gallons/foot        =        gallons		Volume to be Purged (gallons): Total Volume Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1445	0.75	0.75	19.98	26.73	4.58	7.95	4.02	370	0.0	0/0
1450	0.25	1.0	19.98	26.73	4.02	7.95	4.02	370	0.0	0/0
1455	0.25	1.25	19.95	20.82	5.62	1.22	3.94	411	n.m.	0/0
1500	0.25	1.50	19.97	21.10	5.60	1.24	3.97	416	5.78	0/0
1505	0.25	1.75	19.97	20.91	5.62	1.28	3.97	419	5.20	0/0
1510	0.25	2.00	19.97	20.89	5.56	1.24	4.02	417	5.20	0/0
1515	0.25	2.25	19.98	20.97	5.48	1.26	4.08	416	6.21	0/0
1520	0.25	2.50	19.98	20.94	5.46	1.28	4.09	417	5.69	0/0
1525	0.25	2.75	19.98	20.89	5.47	1.30	4.09	419	6.62	0/0
1530	0.20	3.00	19.98	20.87	5.43	1.25	4.10	419	6.62	0/0
1535	0.20	3.20	19.98	20.82	5.44	1.24	4.09	421	10.0	0/0
1540	0.20	3.20	19.98	20.84	5.44	1.23	4.07	421	9.44	0/0

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation; pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/No <b>(No)</b>	Filter Size: _____	Duplicate: Yes/No <b>(No)</b>	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No <b>(No)</b>
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

SAMPLER(S) SIGNATURE: \_\_\_\_\_

J. Waller

3 Jun 13





## GROUNDWATER SAMPLING LOG

Page 1 of 3

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 6/4/13
WELL NO: MW12B	SAMPLE ID: SMSMW12B	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type:	Pump: (S/N):	} same as recorded on ps 3 of this book	Total Well Depth (feet): 261.62
Well Diameter (inches):	Water Quality Meter: (S/N):		Screen Interval (feet):
Tubing Diameter (inches): 3/16ID x 0.250D	Turbidity Meter: (S/N):		Static Depth to Water (feet): 29.83
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N):		Tubing Depth (Begin/End):
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet ) X        gallons/foot        =        gallons			Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")			Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or $\mu S/cm$	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1010	1.5	1.5	29.92							
1015	2.0	2.0	29.93	17.78	3.48	2.20	8.46	170	422	Ø 10
1020	1.0	3.0	29.94	17.77	3.47	2.18	7.99	183	348	
1025	1.0	4.0	29.94	17.70	3.40	2.33	7.68	202	503	
1030	1.0	5.0	29.94	17.57	3.31	2.38	7.45	215	480	
1035	1.0	6.0	29.94	17.62	3.12	2.13	7.28	219	456	
1040	1.0	7.0		17.64	3.07	2.09	7.25	220	413	
	Slowed pump to drop turbidity							219 @		
1045	0.6	7.6	29.90	18.06	2.90	1.75	7.19	287	487	
1050	0.5	8.1	29.90	18.17	2.85	1.69	7.19	218	482	
1055	0.5	8.5	29.89	18.24	2.79	1.63	7.17	217	431	
1100	0.5	9.0	29.89	18.23	2.74	1.56	7.13	217	430	moved pump
1110	1.0	10.0	29.93	17.97	2.74	1.65	7.17	213	7400	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance:  $\pm 5\%$ ; Dissolved Oxygen:  $\pm 0.2$  mg/L or 10% saturation, pH:  $\pm 0.1$  unit; Turbidity:  $<10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
NOTES: (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

Fractures from 55ft to bottom.  
Continues on next Page

SAMPLER(S) SIGNATURE:





# GROUNDWATER SAMPLING LOG

Page 2 of 3

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 4 JUN 13
WELL NO: SMSMW 12B	SAMPLE ID: SMSMW 12B	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type:	Pump: (S/N):	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet)
Tubing Diameter (inches): 3/16ID x 0.25OD	Turbidity Meter: (S/N):	Static Depth to Water (feet)
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N):	Tubing Depth (Begin/End)
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        ) X (        gallons/foot        ) =        gallons		Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1115	1.0	11.0	29.94	17.78	2.72	1.64	7.16	272	728	0/0
1120	0.5	11.5	29.90	17.41	2.68	1.47	7.08	215	161	
1125	0.5	12.0	29.93	17.56	2.60	1.21	6.97	213	60.7	
1130	0.5	12.5	29.90	17.72	2.59	1.16	6.99	209	55.9	
1135	0.5	13.0	29.89	17.82	2.57	1.15	6.99	206	67.8	
1140	0.5	13.5	29.89	17.88	2.56	1.13	6.98	206	90.5	
1145	1.0	14.5	29.88	18.09	2.55	1.09	6.99	205	96.6	
1150	0.7	15.25	29.88	18.11	2.55	1.19	6.93	207	139.0	
1205	1.7	17.00	29.88	18.20	2.53	1.13	6.96	201	181	
1220	2.0	19.0	29.90	18.21	2.50	1.12	6.99	198	134	
1230	0.15	20.15	29.90	17.70	2.53	1.15	6.94	197	94.1	
1235	0.5	20.0	29.90	17.71	2.51	1.11	6.97	195	101	
1240	0.5	21.5	29.90	17.7	2.50	1.08	6.93	197	78.3	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
-------------------------	--------------------	--------------------	---------------------	-------------	-----------------

NOTES: (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

Continued on next page - Turbidity still too high

SAMPLER(S) SIGNATURE: \_\_\_\_\_



# GROUNDWATER SAMPLING LOG

Page 3 of 3

<b>SITE NAME:</b> Smokey Mountain Smelter Site	<b>SITE LOCATION:</b> Knoxville, Tennessee <i>12B</i>	<b>DATE:</b> 4 JUN 2013
<b>WELL NO:</b> SMSMW <del>13B</del> <i>12B</i>	<b>SAMPLE ID:</b> SMSMW <del>13B</del> <i>12B</i>	<b>SAMPLE TIME:</b> 1435
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b> <i>Clear 61st 13</i>		

## PURGING DATA

<b>Well Type:</b>	<b>Pump: (S/N):</b>	<b>Total Well Depth (feet):</b>
<b>Well Diameter (inches):</b>	<b>Water Quality Meter: (S/N):</b>	<b>Screen Interval (feet)</b>
<b>Tubing Diameter (inches):</b> 3/16ID x 0.25OD	<b>Turbidity Meter: (S/N):</b>	<b>Static Depth to Water (feet)</b>
<b>Tubing Material:</b> PTFE (Teflon)	<b>Water Level Indicator: (S/N):</b>	<b>Tubing Depth (Begin/End)</b>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet        ) X        gallons/foot        =        gallons		<b>Volume to be Purged (gallons):</b>
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		<b>Total Volume Purged (gallons):</b>

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1250	1.0	22.5	29.90	18.15	2.49	1.00	6.93	197	67.3	<i>6/0</i>
1300	1.0	23.5	29.90	18.44	2.45	0.96	6.90	196	73.7	<i>8/0</i>
1310	0.5	24.0	29.89	18.89	2.43	0.79	6.96	191	68.8	
1320	0.5	24.5	29.89	19.29	2.44	0.77	6.95	189	78.9	
1330	1.5	26.0	29.90	18.43	2.44	0.89	6.97	185	47.8	
1340	1.5	27.5	29.90	17.89	2.46	1.08	6.94	188	38.3	
1350	1.5	29.0	29.90	17.96	2.43	1.02	6.94	189	34.9	
1400	1.0	30.0	29.90	17.59	2.45	1.02	6.86	193	52.9	
1410	1.0	31.0	29.90	17.46	2.44	0.92	6.86	196	21.3	
1415	1.0	32.0	29.90	17.58	2.42	0.88	6.84	196	13.3	
1420	1.0	33.0	29.90	17.55	2.41	0.86	6.87	194	10.5	
1425	1.0	34.0	29.90	17.37	2.43	0.91	6.88	195	10.2	
1430	1.0	35.0	29.90	17.38	2.42	0.90	6.89	194	10.1	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

<b>Field Filtered:</b> Yes/ <i>No</i>	<b>Filter Size:</b> _____	<b>Duplicate:</b> Yes/ <i>No</i>	<b>Duplicate ID:</b> _____	<b>Time:</b> _____	<b>MS/MSD:</b> Yes/ <i>No</i>
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**





## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 5 JUN 13
WELL NO: SMS MW02A	SAMPLE ID: SMS MW 02A	SAMPLE TIME: 1000
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type: <i>submers.</i>	Pump: (S/N): <i>SS Geo Sub Pump</i>	Total Well Depth (feet): <i>27</i>
Well Diameter (inches): <i>2"</i>	Water Quality Meter: (S/N): <i>U5000 UC4FRFAK</i>	Screen Interval (feet): <i>17-27</i>
Tubing Diameter (inches): <i>3/16ID x 0.250D</i>	Turbidity Meter: (S/N): <i>None</i>	Static Depth to Water (feet): <i>14.05</i>
Tubing Material: <i>PTFE (Teflon)</i>	Water Level Indicator: (S/N): <i>Heron Dipper T 26506</i>	Tubing Depth (Begin/End): <i>~ 23'</i>
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = ( <i>27</i> feet - <i>14</i> feet ) X <i>0.163</i> gallons/foot = <i>6.5</i> gallons <i>3X</i>		Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or $\mu S/cm$	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mv)	Turbidity (NTUs)	Odor/ Color Observation
0910	1	1	14.05	17.93	10.8	1.63	9.74	-672	29.0	<i>0/gray</i>
0915	0.75	1.75	14.05	17.86	10.9	0.86	9.74	-597	23.9	<i>0/ "</i>
0920	1.0	2.75	14.05	17.82	10.9	0.48	9.73	-526	26.8	<i>0/ "</i>
0925	1.0	3.75	14.05	17.82	10.9	0.34	9.74	-506	36.8	<i>0/ "</i>
0930	1.0	4.75	14.05	17.82	11.0	0.09	9.78	-472	28.6	<i>0/ "</i>
0935	1.0	5.75	14.05	17.82	11.0	0.00	9.78	-470	22.8	<i>0/ "</i>
0940	1.0	6.75	14.05	17.84	11.0	0.00	9.79	-469	20.2	<i>0/ brown</i>
0945	1.0	7.75	14.05	17.87	11.0	0.00	9.78	-462	14.9	<i>0/ clear</i>
0950	<i>2.0</i>	8.5	14.05	17.89	11.0	0.00	9.78	-457	11.5	<i>0/ clear</i>
0955	0.75	9.2	14.05	17.94	11.0	0.00	9.78	-461	6.55	<i>0/ clear</i>

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance:  $\pm 5\%$ ; Dissolved Oxygen:  $\pm 0.2$  mg/L or 10% saturation, pH:  $\pm 0.1$  unit; Turbidity:  $<10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ <input checked="" type="checkbox"/> No	Filter Size: _____	Duplicate: Yes/ <input checked="" type="checkbox"/> No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ <input checked="" type="checkbox"/> No
NOTES: (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					
<p><i>Slowed pump @ 0945 to help clear turbidity</i></p> <p><i>Note Rinse collected on pump used @ MW02A prior to sample purge on 6/4/13</i></p> <p><i>SMS RB060413 Lin</i></p>					

SAMPLER(S) SIGNATURE:

*Lin*

5 JUN 13





# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE:
WELL NO:	SAMPLE ID:	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type:	Pump: (S/N):	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet)
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet)
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End)
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                      feet   –                      feet) X                      gallons/foot   =                      gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge (“Sipping from the Top”) or Low-Flow (“Tubing in Mid Screen”)		Total Volume Purged (gallons):

[illegible]

**Well Capacity (Gal/Ft):** 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
**Stabilization Criteria Range:** Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.1$  mg/L or 10% saturation, pH:  $\geq 1$  unit; Turbidity:  $<10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: ____	Duplicate: Yes/ No	Duplicate ID: ____	Time: ____	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**





# GROUNDWATER SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelter Site	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b>
<b>WELL NO:</b>	<b>SAMPLE ID:</b>	<b>SAMPLE TIME:</b>
<b>WEATHER CONDITIONS/GENERAL OBSERVATIONS:</b>		

## PURGING DATA

Well Type:	Pump: (S/N):	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet)
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet)
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End)
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                feet   –                feet) X                gallons/foot   =                gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\geq 0.1$  unit; Turbidity:  $< 10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
-------------------------	--------------------	--------------------	---------------------	-------------	-----------------

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

**SAMPLER(S) SIGNATURE:**





MANAGING THE VISION® ENVIRONMENTAL | FACILITIES | LOGISTICS

# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE:
WELL NO:	SAMPLE ID:	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type:	Pump: (S/N):	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet)
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet)
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End)
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                feet    –                feet ) X                gallons/foot    =                gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: +5%; Dissolved Oxygen: ~0.2 mg/L or 10% saturation, pH: +0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**





**PURGING DATA**

## PURGING DATA

<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                feet –                feet ) X                gallons/foot =                gallons	Volume to be Purged (gallons):
---	--------------------------------

**Purge Method:** Traditional Multiple Volume Purge (“Sipping from the Top”) or Low-Flow (“Tubing in Mid Screen”)

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance:  $\pm 5\%$ ; Dissolved Oxygen:  $\pm 0.2$  mg/L or 10% saturation, pH:  $\pm 0.1$  unit; Turbidity:  $<10$  NTU

## FIELD SCREENING SUMMARY

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

**SAMPLER(S) SIGNATURE:**



**SMOKEY MOUNTAIN SMELTERS**  
Knoxville, Knox County, Tennessee

**June 2013**

**Field Event 3**

**Remedial Investigation / Feasibility Study**

**Groundwater Sampling Log**

**Book 2 of 2**



**J.M.WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**





MANAGING THE VISION OF ENVIRONMENTAL FACILITIES &amp; LOGISTICS

## INSTRUMENT AND CALIBRATION LOG

Site Name: Conne Mills Smokey Mtn Smelters

Instrument Readings					Instrument		
Calibration Date	Parameter Calibrating	Pre-Calibration	Post-Calibration	Signature	Type	Manufacturer	Serial Number
6/13/13	DO mg/L	89.8	100.0	Engel	Water Quality	YSI 556 MPS	13B100008
	DO %	6.29	6.99				
	4 pH	-	7.00				
	Spec. Cond. 4.49	4.603	4.49				
	7 pH	-	6.95				
	DO mg/L		7.95	Engel		Hanba U53	XRTTH4VK
	4 pH		7.02				
	Spec cond.		4.58				
	ONCU		0.00				
6/13/13	pH	4.00		Engel	Water Quality	Hanba U5000	4C4FRFAK
	DO	6.01					
	Spec Cond.	4.51					
03 Jun 13	Turb	0.62					
	pH 7	7.0	7.08	Engel	Water Quality	YSI 556 MPS	13B100008
	pH 4	-	4.15				
	pH 10	-	10.06				
	Sp Cond 1.413	-	1.35P				
	ORP 240	-	236.1				
	DO 100%	-	95.8				
03 Jun 13	RESIDUM 20 MV	-	20.1	Engel	Water Quality	Hanba 2100 Q	ONE 020403
6/4/13	DO mg/L	95.4	95.4	Engel	Water Quality	YSI 556	13B100008
	DO %		95.4/87				
	4 pH		4.02/4.20				
	7 pH		7.01/7.08				
	ORP		2				
	Spec cond		4.51/4.46				

pH  
DO mg/L  
Spec cond  
ORP



6/5/13

Douglas  
Dobson  
specimen  
4 pit  
7 pit

108.6  
9.20  
4.39  
4.04  
7.01

-  
4.45  
4.08  
7.08

751556

136100008

Hydrid



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>6/3/13</b>
WELL NO: <b>MW-13A</b>	SAMPLE ID: <b>MW-13A</b>	SAMPLE TIME: <b>1517</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: <b>Partly Cloudy / Breezy / 70's</b>		

### PURGING DATA

Well Type: <b>Plush</b>	Pump: (S/N): <b>Geosubpump 650003</b>	Total Well Depth (feet): <b>30.0</b>
Well Diameter (inches): <b>2.12</b>	Water Quality Meter: (S/N): <b>YSI 556 MPS</b>	Screen Interval (feet): <b>30.15</b>
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N): <b>Hach 2100Q 020403</b>	Static Depth to Water (feet): <b>20.10</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>Heron Dpper T 26506</b>	Tubing Depth (Begin/End): <b>29.5</b>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = ( <b>30</b> feet - <b>20.10</b> feet ) X <b>0.14</b> gallons/foot = <b>1.58</b> gallons		Volume to be Purged (gallons): <b>To Stable</b>
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons): <b>~2.0 gal</b>

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1250		0.10	20.15	18.76	1.884	8.21	4.60	147.3	175	Gray Cloudy
1337	0.90	1.00	20.77	19.00	1.876	6.20	4.68	200.8	12.2	clear
1350	0.10	1.10	20.91	19.57	1.884	5.74	4.69	209.1	7.93	clear
1423	0.4	1.5	21.30	19.63	1.894	5.71	4.71	218.3	12.5	
1438	0.2	1.7	20.82	21.14	1.871	5.23	4.73	225.6	4.78	
1453	0.05	1.75	21.34	22.25	1.882	5.00	4.73	231.5	4.86	
1508	0.05	1.8	21.86	21.60	1.917	5.18	4.74	244.6	5.23	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation; pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/No <input checked="" type="checkbox"/> No	Filter Size: _____	Duplicate: Yes/No <input checked="" type="checkbox"/> No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No <input checked="" type="checkbox"/> No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.) <div style="font-family: cursive; font-size: 1.2em;">           Background well - full scan            metals + Hg      1 HNO3            SVOCs              2 numbers            Pest            PCBs              1            VOCs              3 VOC            Chloricals      2 Poly         </div>					

SAMPLER(S) SIGNATURE: Linda [Signature]





J.M. WALLER  
ASSOCIATES, INC.

MANAGING THE VISION | ENVIRONMENTAL | FACILITIES | LOGISTICS

## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 6/3/13
WELL NO: MW-13B	SAMPLE ID: SMS MW13B	SAMPLE TIME: 1651
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: Mostly Cloudy / 80		

### PURGING DATA

Well Type: Push	Pump: (S/N): GeoSub pump 650002	Total Well Depth (feet): 29.90
Well Diameter (inches): 2.0	Water Quality Meter: (S/N): <del>As recorded on pg 1</del>	Screen Interval (feet): 15 ft
Tubing Diameter (inches): 3/16 ID x 0.250 OD	Turbidity Meter: (S/N): <del>As recorded on pg 1</del>	Static Depth to Water (feet): 25.79
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N): <del>As recorded on pg 1</del>	Tubing Depth (Begin/End): ~ 28 ft
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = (29.90 feet - 25.79 feet) X 0.16 gallons/foot = 0.65 gallons		Volume to be Purged (gallons): To Stable
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid-Screen")		Total Volume Purged (gallons): ~ 9.0 gal

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (µS/cm or ms/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1533	1.5	1.5	25.84	17.66	0.752	0.39	7.06	132.7	12.3	NONE/YELLOW MILKY
1538	1.0	2.5	25.84	17.71	0.735	0.34	7.06	115.7	12.4	NONE/MILKY
1550	1.0	3.5	25.86	17.57	0.726	0.20	7.05	93.8	81.2	NONE/MILKY
1603	1.0	4.5	25.89	17.42	0.717	0.30	7.05	79.1	56.2	NONE/MILKY
1613	1.0	5.5	25.84	17.53	0.722	0.22	7.04	69.2	39.5	NONE/NONE
1623	1.0	6.5	25.83	17.45	0.723	0.18	7.04	64.7	20.5	NONE/NONE
1634	1.0	7.5	25.86	17.35	0.728	0.14	7.05	62.0	14.5	" "
1649	1.0	8.5	25.86	17.39	0.751	0.12	7.05	59.2	7.20	" "

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/No	Filter Size:	Duplicate: Yes/No	Duplicate ID:	Time:	MS/MSD: Yes/No
NOTES: (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					
Metals & H <sub>2</sub> S - 1 Poly (MSMSD) SVOCs - 4 Ambers (MSMSD) Pest - 4 Ambers (MSMSD) PCBs - 4 Ambers (MSMSD) VOCs - 9 VOAs (MSMSD) MNA - 2 Poly					

SAMPLER(S) SIGNATURE:

*[Signature]*





## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 6/4/10
WELL NO: MW-11A	SAMPLE ID: SMSMW11A	SAMPLE TIME: 1612
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: Mostly Sunny / Breezy / 80's		

## PURGING DATA

Well Type: Flush	Pump: (S/N): Peristaltic Gotech	Total Well Depth (feet): 30.30
Well Diameter (inches): 2.12	Water Quality Meter: (S/N): ysi 556 mps 1381000008	Screen Interval (feet): 15-30 ft
Tubing Diameter (inches): 3/16 ID x 0.250 OD	Turbidity Meter: (S/N): HF Scientific DPT-1566	Static Depth to Water (feet): 3.58
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N): Heron Dppst T	Tubing Depth (Begin/End): ~29.30 ft
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = (30.3 feet - 3.58 feet) X 0.16 gallons/foot = 4.27 gallons		Volume to be Purged (gallons): To Stable
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons): ~6.0

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1247	—	0.20	3.78	16.97	16.64	1.25	8.31	-16.0	72.7	Slightly Cloudy
1300	0.3	0.50	3.78	16.72	16.11	0.40	8.50	-38.5	22.6	Clear
1310	0.5	1.00	3.78	16.63	15.34	0.35	8.57	-24.0	34.7	Clear
1323	0.5	1.50	3.78	17.21	15.17	0.35	8.59	-13.3	38.0	Clear
1340	0.5	2.00	3.78	17.22	15.45	0.33	8.59	-4.8	40.0	Clear
1412	0.75	2.75	3.78	17.55	15.40	0.31	8.59	0.8	48.7	Clear
1430	0.50	3.25	—	17.87	15.33	0.30	8.60	-2.1	40.1	Clear
—	.25	3.5	3.71	17.88	15.21	0.30	8.60	-6.6	33.2	Yellow tint
1509	0.5	4.00	3.71	17.85	15.04	0.24	8.60	-9.6	38.2	" "
1528	0.50	4.5	3.71	17.97	14.99	0.23	8.60	-11.3	25.8	Yellow tint
1545	0.50	5.0	3.71	16.97	15.28	0.31	8.62	-11.3	13.5	yellow tint
1602	0.5	5.5	3.71	16.98	15.05	0.37	8.64	-7.4	9.48	Clear
1609	0.25	5.75	3.71	17.88	14.90	0.22	8.67	-6.1	7.25	Clear

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ <input checked="" type="checkbox"/> No	Filter Size: —	Duplicate: Yes/ <input checked="" type="checkbox"/> No	Duplicate ID: —	Time: —	MS/MSD: Yes/ <input checked="" type="checkbox"/> No
NOTES: (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					
Total Metals + Hg Classicals			EFFLUENT BUBBLY EFFERESCES IN CUVETTE w/ALICHO PAINT ODOUR		

SAMPLER(S) SIGNATURE:





MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 6/4/13
WELL NO: SMSWS02	SAMPLE ID: SMS SW02	SAMPLE TIME: 1500
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: Mostly sunny / 80°F		

Well Type: <u>Surface Water</u>	Pump: (S/N): <u>                    </u>	Total Well Depth (feet): <u>                    </u>
Well Diameter (inches): <u>                    </u>	Water Quality Meter: (S/N): <u>Horba</u>	Screen Interval (feet): <u>                    </u>
Tubing Diameter (inches): <u>                    </u> <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N): <u>AIA</u>	Static Depth to Water (feet): <u>                    </u>
Tubing Material: <u>PTE (Teflon)</u>	Water Level Indicator: (S/N): <u>                    </u>	Tubing Depth (Begin/End): <u>                    </u>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                      feet –                      feet ) X                      gallons/foot =                      gallons		Volume to be Purged (gallons): <u>                    </u>  Total Volume Purged (gallons): <u>                    </u>
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: + 5%; Dissolved Oxygen: + 0.2 mg/L or 10% saturation, pH: + 0.1 unit; Turbidity: <10 NTU

Field Filtered: Yes/No Filter Size: Duplicate: Yes/No Duplicate ID: Time: MS/MSD: Yes/No

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

Seep location

Metals  
SVOCs  
VOCs

**SAMPLER(S) SIGNATURE:**

Lincoln / Matt Volter



# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 6/5/13
WELL NO: MW11B	SAMPLE ID: SMSMW11B	SAMPLE TIME: 1110
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: Partly Cloudy / 70s		

## PURGING DATA

Well Type: Plush	Pump: (S/N):	} same as recorded on PS 3 & tws book	Total Well Depth (feet): 56.9
Well Diameter (inches): 2.0	Water Quality Meter: (S/N):		Screen Interval (feet): 41-46 (15 ft)
Tubing Diameter (inches): 3/16 ID x 0.25 OD	Turbidity Meter: (S/N):		Static Depth to Water (feet): 5.90
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N):		Tubing Depth (Begin/End): ~ 51.5
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = ( 56.9 feet - 5.90 feet ) X 0.16 gallons/foot = 8.16 gallons			Volume to be Purged (gallons): To Stable Total Volume Purged (gallons): ~ 3.5 gal
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")			

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
0854		0.10	6.45	19.09	19.56	7.26	8.33	150.5	2.44	yellow tint
0913	0.40	0.50	6.45	19.03	19.50	1.33	8.34	121.9	5.4	
0933	0.50	1.00	-	19.81	19.35	1.44	8.34	110.1	19.0	
0954	0.50	1.50	-	19.18	19.46	6.84	8.33	101.2	5.81	
1010	0.50	2.00	-	19.47	19.43	6.07	8.33	94.7	2.12	
1030	0.5	2.50	-	19.18	19.39	4.72	8.33	86.4	2.71	
1043	0.25	2.75	-	19.36	19.42	0.27	8.33	89.2	2.25	
1056	0.25	3.00	-	19.64	19.32	0.25	8.33	90.2	4.35	
1109	0.25	3.25	-	19.84	19.36	0.28	8.33	89.7	2.87	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No	Filter Size:	Duplicate: Yes/No	Duplicate ID: SMSMW11B	Time: 1111	MS/MSD: Yes/No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.) <del>8</del> <del>11</del> <del>11</del> <del>11</del> Methods + H <sub>2</sub> Classical Note: DO is high - possible due to flow thru cell - the base would not tighten so noticed air bubbles @ 1030 (flow thru cell was sitting under a bucket to shade from sun - blocking view of flow thru cell.) Placed probe on a cup with water flushing from bottom.					

SAMPLER(S) SIGNATURE:

*[Signature]*





Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance:  $\pm 5\%$ ; Dissolved Oxygen:  $+ 0.2$  mg/L or 10% saturation, pH:  $\pm 0.1$  unit; Turbidity:  $< 0.1$  NTU

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)





PURGING DATA		
Well Type:	Pump: (S/N):	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet)
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet)
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End)
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                      feet    –                      feet ) X                      gallons/foot    =                      gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

**Well Capacity (Gal/Ft):** 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
**Stabilizing Criteria Range:** Specific Conductance: + 5%; Dissolved Oxygen: + 0.2 mg/L or 10% saturation. pH: + 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: ____	Duplicate: Yes/ No	Duplicate ID: ____	Time: ____	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**





PURGING DATA		
Well Type:	Pump: (S/N):	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet)
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet)
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End)
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                      feet –                      feet ) X                      gallons/foot =                      gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Slipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.85; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance:  $\pm 5\%$ ; Dissolved Oxygen:  $\pm 0.2$  mg/L or 10% saturation, pH:  $\pm 0.1$  unit; Turbidity:  $<10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: ____	Duplicate: Yes/ No	Duplicate ID: ____	Time: _____	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**





# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE:
WELL NO:	SAMPLE ID:	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type:	Pump: (S/N):	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet)
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet)
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End)
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                      feet –                      feet ) X                      gallons/foot =                      gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\leq 1$  unit; Turbidity:  $< 10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No	Filter Size:	Duplicate: Yes/No	Duplicate ID:	Time:	MS/MSD: Yes/No
------------------------	--------------	-------------------	---------------	-------	----------------

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

NO T-201 (Sample Analysis), NO T-202 (Sample Analysis), Photograph Information, Name and Address Sample Mailed Date, No. Observations, Conditions,

**SAMPLER(S) SIGNATURE:**





## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site			SITE LOCATION: Knoxville, Tennessee			DATE:		
WELL NO:			SAMPLE ID:			SAMPLE TIME:		
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:								

## PURGING DATA

Well Type:	Pump: (S/N):	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet)
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet)
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End)
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                      feet –                      feet ) X                      gallons/foot =                      gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\leq 1$  unit; Turbidity:  $\leq 10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**



**SMOKEY MOUNTAIN SMELTERS**  
Knoxville, Knox County, Tennessee

**August 2013**

**Quarterly Event 1**

**Remedial Investigation / Feasibility Study**

**Groundwater and Surface Water Sampling Log**

**Book 3 of 3**



**J.M. WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**

Q1  
8102





MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS

PFWHSSST  
pne 024044

**Site Name:**

Smoky Mtn. Smelters

**Sampling Event:**

August 2013 1st Qtr of Qtrly Sampling

**Instrument/Meter Manufacturer:**

Type of Instrument:

## Water quality ?

2

### 3) Air Monitor ?

Model # Honda U-53

**Manufacturer Serial #**

NK MUMPS (Pine #) 211243

					Instrument Readings			
Calibration Date	Time	Parameter Calibrating	Bump reading	Ok to use?	Signature	Calibrated Reading	End of Day Bump readings	Initial
8/26/13	0900	pH	NA		[Signature]	4.00	4.06	ASG
		Cond 4.49				<del>4.08</del> 4.49	4.42	
		NTU				0.0	0.0	
		DO%				8.82	6.11	
		DO mg/L				108.5	88.3	
8/27/13	0800	pH	NA		[Signature]	4.01	4.03	ASG
		4.49 cond				4.53	4.46	
		0 NTU				0.00	0.0	
		DO%				7.91	6.03 mg/L	
		DO mg/L				97.6	85.2%	
8/28/13	0822	pH			[Signature]	4.00 4.01	4.73	ASG
		4.49 cond				4.46 4.49	4.85	
		0 NTU				<del>4.69</del> 0.00	237	
		DO%				108.8 10.8	6	
		DO mg/L				8.59 7.96	6.68	
amatt 2020		0 NTU					0.17	
		10 NTU					10.62	

used Lamotte 2020 vial for durability readings





## SURFACE WATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelters			SITE LOCATION: Knoxville, Tennessee			DATE: 8/26/2013		
SAMPLE ID: SMSSDSW20						SAMPLE TIME: 1605		
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity	Hexavalent Chromium (Must Filter)	Fe (capsule)
1001	27.72	0.321	9.05	7.62	315	30.5	YES <input type="radio"/> NO <input checked="" type="radio"/>	Range: Result: 0 mst
Field Filtered: Yes/No <input checked="" type="radio"/>		Filter Size:	Duplicate: Yes/No <input checked="" type="radio"/>		Duplicate ID:	Time:	MS/MSD: Yes/No <input checked="" type="radio"/>	
SAMPLER(S) SIGNATURE: <i>[Signature]</i>								

Total Depth ~ 5.5 ft Water Quality Meter ~ 1.5 ft

SITE NAME: Smokey Mountain Smelters			SITE LOCATION: Knoxville, Tennessee			DATE: 8/26/2013		
SAMPLE ID: SMSSDSW10						SAMPLE TIME: 1020		
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity	Hexavalent Chromium (Must Filter)	Fe (capsule)
1022	26.56	0.285	8.60	7.80	322	44.3	YES <input type="radio"/> NO <input checked="" type="radio"/>	Range: Result: 0 mst
Field Filtered: Yes/No <input checked="" type="radio"/>		Filter Size:	Duplicate: Yes/No <input checked="" type="radio"/>		Duplicate ID:	Time:	MS/MSD: Yes/No <input checked="" type="radio"/>	
SAMPLER(S) SIGNATURE: <i>[Signature]</i>								

Total Depth ~ 2.5 ft. Water Quality Meter ~ 1.0 ft

SITE NAME: Smokey Mountain Smelters			SITE LOCATION: Knoxville, Tennessee			DATE: 8/26/13		
SAMPLE ID: SMSSDSW05						SAMPLE TIME: 1040		
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity	Hexavalent Chromium (Must Filter)	Fe (capsule)
1042	27.09	0.426	8.29	7.64	307	47.4	YES <input type="radio"/> NO <input checked="" type="radio"/>	Range: Result: 0 mst
Field Filtered: Yes/No <input checked="" type="radio"/>		Filter Size:	Duplicate: Yes/No <input checked="" type="radio"/>		Duplicate ID:	Time:	MS/MSD: Yes/No <input checked="" type="radio"/>	
SAMPLER(S) SIGNATURE: <i>[Signature]</i>								

Total Depth ~ 2. Water Quality Meter ~ 1.0 ft



## SURFACE WATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelters				SITE LOCATION: Knoxville, Tennessee				DATE: 8/26/13	
SAMPLE ID: SMSSDSW14								SAMPLE TIME: 1315	

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turb	Hexavalent Chromium (Must Filter)	Fe (capsule)
1315	20.24	0.242	6.89	7.44	313	0.0	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	Range: Result: 0 mg/L

Field Filtered: Yes/No ☒ Filter Size: Duplicate: Yes/No ☒ Duplicate ID: Time: MS/MSD: Yes/No ☒

SAMPLER(S) SIGNATURE: *[Signature]*

Flow = 772 cfs  
101. distance/day  
Depth = 6.3  
6.75 in.  
Width = 6.5 ft

SITE NAME: Smokey Mountain Smelters				SITE LOCATION: Knoxville, Tennessee				DATE: 8/26/13	
SAMPLE ID: SMSSDSW11								SAMPLE TIME: 1340	

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turb	Hexavalent Chromium (Must Filter)	Fe (capsule)
1418	21.42	0.447	6.28	7.82	302	89.3	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	Range: Result:

Field Filtered: Yes/No ☒ Filter Size: Duplicate: Yes/No ☒ Duplicate ID: Time: MS/MSD: Yes/No ☒

SAMPLER(S) SIGNATURE: *[Signature]*

SAMPLERS FORCED TO RETREAT DUE TO YELLOWJACKETS. NYLAND RETURNED TO A LOCATION ~30' DOWNSTREAM TO AVOID YELLOW JACKETS. TURBIDITY MAY BE ELEVATED DUE TO SAMPLERS WALKING IN STREAM TO AVOID YELLOWJACKETS.

SITE NAME: Smokey Mountain Smelters				SITE LOCATION: Knoxville, Tennessee				DATE: 8/26/13	
SAMPLE ID: SMSSDSW13								SAMPLE TIME: 1530	

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turb	Hexavalent Chromium (Must Filter)	Fe (capsule)
1534	21.08	0.791	5.95	7.55	321	8.54	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	Range: Result:

Field Filtered: Yes/No ☒ Filter Size: Duplicate: Yes/No ☒ Duplicate ID: Time: MS/MSD: Yes/No ☒

SAMPLER(S) SIGNATURE: *[Signature]*

Flow = 26.2 distance/day (5.4)  
Depth = 5.5 in  
Width = 5.0 ft





J.M. WALLER  
ASSOCIATES, INC.

MANAGING THE VISION | ENVIRONMENTAL | FACILITIES | LOGISTICS

## SURFACE WATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee				DATE: 8/26/13		
SAMPLE ID: <del>SMSSD SW09</del> <del>SMSSW09</del> <del>SMSSD SW09</del>						SAMPLE TIME: 1610		
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Flow Rate	Ferrous Iron (Field Test)
1609	21.43	1.57	5.85	7.65	293	1.40		Range : Result:
Field Filtered: Yes/No <input checked="" type="checkbox"/>		Filter Size: _____	Duplicate: Yes/No <input checked="" type="checkbox"/>		Duplicate ID: _____	Time: _____	MS/MSD: Yes/No <input checked="" type="checkbox"/>	

SAMPLER(S) SIGNATURE: *[Signature]*

18.4 distance/day (0.34)

Depth = 4.5 in

Width = 3.0 ft

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee				DATE: 8/26/13		
SAMPLE ID: SMSSD SW09 - Sprng						SAMPLE TIME: 1625		
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity	Hexavalent Chromium (Must Filter)	Fe (capsule)
1625	21.69	1.57	5.35	7.70	300	4.7	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Range : Result:
Field Filtered: Yes/No <input checked="" type="checkbox"/>		Filter Size: _____	Duplicate: Yes/No <input checked="" type="checkbox"/>		Duplicate ID: _____	Time: _____	MS/MSD: Yes/No <input checked="" type="checkbox"/>	

SAMPLER(S) SIGNATURE: \_\_\_\_\_

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee				DATE: 8/27/13	
SAMPLE ID: _____						SAMPLE TIME: _____	
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Hexavalent Chromium (Must Filter)	Fe (capsule)
						YES NO	Range : Result:
Field Filtered: Yes/No		Filter Size: _____	Duplicate: Yes/No		Duplicate ID: _____	Time: _____	MS/MSD: Yes/No

SAMPLER(S) SIGNATURE: \_\_\_\_\_





## SURFACE WATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelters	SITE LOCATION: Knoxville, Tennessee	DATE: 8/27/13
SAMPLE ID: SMS SDSW08		SAMPLE TIME: 0830

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Flow Rate	Ferrous Iron (Field Test)
0834	20.33	163	4.79	7.41	279	4.56		Range : Result:
Field Filtered: Yes/ No		Filter Size: _____	Duplicate: Yes/ No		Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No	

SAMPLER(S) SIGNATURE: \_\_\_\_\_

Note - 2 dead crawfish @ sample location  
width = 8 ft  
depth = ~ 8 in.

yellow jackets again

SITE NAME: Smokey Mountain Smelters	SITE LOCATION: Knoxville, Tennessee	DATE: 8/27/13
SAMPLE ID: SMS SDSW08-SPRNG		SAMPLE TIME: 0905

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Hexavalent Chromium (Must Filter)	Fe (capsule)
0925	20.82	143	3.6	7.41	260	148	YES NO Range : Result:
Field Filtered: Yes/ No		Filter Size: _____	Duplicate: Yes/ No		Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No

SAMPLER(S) SIGNATURE: \_\_\_\_\_

w - 1'  
d - 3"

SITE NAME: Smokey Mountain Smelters	SITE LOCATION: Knoxville, Tennessee	DATE: 8/27/13
SAMPLE ID: SMS SDSW04		SAMPLE TIME: 1030

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	NTU	Hexavalent Chromium (Must Filter)	Fe (capsule)
1034	22.15	255	2.0	6.70	264	728	YES NO	Range : Result:
Field Filtered: Yes/ No		Filter Size: _____	Duplicate: Yes/ No		Duplicate ID: _____	Time: 1035	MS/MSD: Yes/ No	

SAMPLER(S) SIGNATURE: \_\_\_\_\_

SMS SDSW12 8/27/13 1215  
1217 24.05°C 8.03 pH 2430 ORP 245 ms/cm 17.3 NTU  
16.46 mg/L  
VOD



SMSSDSW03 1240

1240 23.38°C 7.24 pH 281 ORP 2.23 ms/cm 17.1 NTU  
3.31 ms/L.

SMSSDSW03 - Dry - Stagnant puddle < 2' N

SMSSDSW01 1330

1331 22.56°C 7.73 pH 264 ORP 0.555 ms/cm  
17.1 NTU 5.79 ms/L.



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>8/28/13</b>
WELL NO: <b>NW 03B</b>	SAMPLE ID: <b>SMSMW03B</b>	SAMPLE TIME: <b>1305</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: <b>Hot/ Humid/ Slight Breeze</b>		

### PURGING DATA

Well Type: <b>Flush</b>	Pump: (S/N): <b>Geotech SS Geo Sub Pump w/ Controller # 20881 Pme #</b>	Total Well Depth (feet): <b>66</b>
Well Diameter (inches): <b>2.0</b>	Water Quality Meter: (S/N): <b>Horba U-53 021143</b>	Screen Interval (feet): <b>56-66</b>
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N): <b>A/A Lamotte 2020we Pme # 019296</b>	Static Depth to Water (feet):
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>Solenst Water Level Meter # 903812</b>	Tubing Depth (Begin/End): <b>mid screen</b>

**1 WELL VOLUME PURGE** = (Total Well Depth - Static Depth to Water) X Well Capacity  
= (        feet        -        feet ) X        gallons/foot        =        gallons

Volume to be Purged (gallons): **To Stable**  
Total Volume Purged (gallons):

**Purge Method:** Traditional Multiple Volume Purge ("Slipping from the Top") or Low-Flow ("Tubing in Mid Screen")

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1003		0.25	33.40	20.57	2100.0	1.69	5.57	152	825	cloudy w/ rust color
1017	0.75	1.00	36.55	19.83	99.1	1.29	5.62	72	430	A/A
1042	1.25	2.25	38.08	20.38	2100.0	0.80	5.61	107	524	
1100	1.25	3.50	37.58	20.91	2100.0	0.78	5.62	121	390	orange tint cloudy
1112	0.50	4.00	37.47	21.17	2100.0	0.74	5.62	124	280	
1138	1.00	5.00	37.29	21.37	2100.0	0.63	5.63	125	154	slightly cloudy
1152	0.25	5.25	37.01	21.80	2100.0	0.62	5.64	127	128	clearer
1209	1.00	6.25	37.40	21.74	2100.0	0.60	5.64	131	81.8	
1229	0.75	7.00	37.58	21.90	2100.0	0.63	5.65	133	57.0	
1249	1.00	8.25	37.39	22.26	2100.0	0.53	5.64	140	33.0	
1303	0.75	9.00	37.36	21.85	2100.0	0.55	5.64	145	27.0	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0028; 5/16" = 0.004; 3/8" = 0.008; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/No <b>No</b>	Filter Size: _____	Duplicate: Yes/No <b>No</b>	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No <b>No</b>
----------------------------------	--------------------	-----------------------------	---------------------	-------------	--------------------------

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

**SAMPLER(S) SIGNATURE:**



## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 8/28/13
WELL NO: MW11A	SAMPLE ID: SMSMW11A	SAMPLE TIME: 1513
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: Hazy / Hot / Humid. No Breeze		

## PURGING DATA

Well Type: <i>Push</i>	Pump: (S/N): <i>Perstatite Pneta 19994</i>	Total Well Depth (feet): <i>30</i>
Well Diameter (inches): <i>2" W</i>	Water Quality Meter: (S/N):	Screen Interval (feet): <i>15-30</i>
Tubing Diameter (inches): <i>3/16ID x 0.25OD</i> ✓	Turbidity Meter: (S/N):	Static Depth to Water (feet): <i>5.93</i>
Tubing Material: <i>PTFE (Teflon)</i> ✓	Water Level Indicator: (S/N):	Tubing Depth (Begin/End): <i>Mid Screen</i>
$1 \text{ WELL VOLUME PURGE} = (\text{Total Well Depth} - \text{Static Depth to Water}) \times \text{Well Capacity}$ $= (\text{feet} - \text{feet}) \times \text{gallons/foot} = \text{gallons}$		Volume to be Purged (gallons): <i>To Static</i>
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; **1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88**  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; **5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016**  
 Stabilization Criteria Range: Specific Conductance: < 5%; Dissolved Oxygen: > 0.2 mg/L or 10% saturation, pH: > 0.1 unit; Turbidity: < 10 NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No	Filter Size: _____	Duplicate: Yes/No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

**SAMPLER(S) SIGNATURE:**



**SMOKEY MOUNTAIN SMELTERS**  
Knoxville, Knox County, Tennessee

**August 2013**

**Quarterly Event 1**

**Remedial Investigation / Feasibility Study**

**Groundwater Sampling Log**

**Book 1 of 3**



**J.M.WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**





MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS

## INSTRUMENT AND CALIBRATION LOG

**Site Name:**

### Sampling Event:

**Instrument/Meter Manufacturer:**

**Type of Instrument:**

### Water quality ?

## Air Monitor ?

Model # Holyb A US000

Manufacturer Serial # PINE 020894

[illegible]



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>8/27/13</b>
WELL NO: <b>SMSNW12A</b>	SAMPLE ID: <b>SMSNW12A</b>	SAMPLE TIME: <b>1558</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Well Type: <b>PVC</b>	Pump: (S/N): <b>BLADDER</b>	Total Well Depth (feet): <b>40</b>
Well Diameter (inches): <b>2"</b>	Water Quality Meter: (S/N): <b>HORIBA U5000/US3 19351</b>	Screen Interval (feet): <b>32-40</b>
Tubing Diameter (inches): <b>3/16ID x 0.250D</b>	Turbidity Meter: (S/N): <b>LAMOTTE 2020 WE</b>	Static Depth to Water (feet): <b>32.77</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>SOLWEST</b>	Tubing Depth (Begin/End): <b>- 36.0</b>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet        ) X        gallons/foot        =        gallons		Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1414	0.25	0.25	33.51	21.60	5.30	3.00	6.62	165	21.8	
1423	0.25	0.5	33.80	20.57	4.73	2.21	6.53	167	11.2	
1437	0.5	1.0	34.75	18.38	4.74	1.11	6.45	167	21.5	
1451	0.5	1.5	34.56	20.56	4.80	0.98	6.43	166	23.6	
1516	0.5	2.0	34.49	20.49	5.02	1.11	6.51	152	20.2	
1542	0.5	2.5	34.40	21.81	5.16	1.11	6.57	147	10.7	
1554	0.25	2.75	34.75	21.74	5.22	1.19	6.58	148	5.58	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
-------------------------	--------------------	--------------------	---------------------	-------------	-----------------

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

*THIS PAGE SKIPPED IN ERROR.*

*SAMPLE COLLECTED 8/27 AFTER PAGE 7 OF 7.*

SAMPLER(S) SIGNATURE: \_\_\_\_\_



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smoky Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>8/26/13</b>
WELL NO: <b>SMS MW 13 B</b>	SAMPLE ID: <b>SMS MW 13 B</b>	SAMPLE TIME: <b>1132</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: <b>WARM, 1 to mid</b>		

### PURGING DATA

Well Type: <b>PVC</b>	Pump: (S/N): <b>Geo Sub 20881</b>	Total Well Depth (feet): <b>71</b>
Well Diameter (inches): <b>2"</b>	Water Quality Meter: (S/N): <b>20337 H-R-8A</b>	Screen Interval (feet):
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N): <b>" "</b>	Static Depth to Water (feet): <b>31.71</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>SOLINST 903812</b>	Tubing Depth (Begin/End): <b>64.0'</b>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet -        feet ) X        gallons/foot =        gallons		Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1054	0.25	0.25	31.71	24.84	0.003	8.15	4.62	253	---	CLEAR
1106	1.00	1.25	32.15	17.71	0.662	7.61	6.72	59	129	CLOUDY
1111	0.75	2.00	32.10	17.82	0.670	5.00	6.67	79	28.6	CLEAR
1118	0.75	2.75	32.14	17.98	0.681	4.19	6.62	94	14.5	CLEAR
1125	0.75	3.50	32.13	18.06	0.683	3.66	6.60	108	8.38	CLEAR
1129	0.25	3.75	32.06	18.27	6.683	3.47	6.62	110	7.56	CLEAR

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/ No    Filter Size: _____	Duplicate: Yes/ No    Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)			

**SAMPLER(S) SIGNATURE:**



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>8/26/13</b>
WELL NO: <b>SMSMW13A</b>	SAMPLE ID: <b>SMSMW13A</b>	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Well Type: <b>PVC</b>	Pump: (S/N): <b>GED SUB 20881</b>	Total Well Depth (feet): <b>30</b>
Well Diameter (inches): <b>2"</b>	Water Quality Meter: (S/N): <b>HAZIBA U5000</b>	Screen Interval (feet): <b>15-30</b>
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N): <b>020894</b>	Static Depth to Water (feet): <b>28.62</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End): <b>29.8</b>

**1 WELL VOLUME PURGE** = (Total Well Depth - Static Depth to Water) X Well Capacity  
= (        feet    -        feet ) X        gallons/foot    =        gallons

**Purge Method:** Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1255	0.25	6.25	>28.25	21.80	1.66	5.71	5.21	298	502	BROWN
1306	0.50	0.75	28.25	22.90	1.82	4.98	4.82	343	386	BROWN
1315	<b>PURGED DRY</b>									
1650	<b>RETURNED - NO WATER</b>									
0800	<b>8/27/13 RETURNED - 0.25' WATER IN WELL</b>									

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
-------------------------	--------------------	--------------------	---------------------	-------------	-----------------

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

ALMOST NO WATER IN WELL. VERY LOW FLOW MAINTAINED.  
 PUMPED DRY AT 1308.

**SAMPLER(S) SIGNATURE:**



# GROUNDWATER SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelter Site	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 8/26/13
<b>WELL NO:</b> SMS MW 02A	<b>SAMPLE ID:</b> SMS MW 02A	<b>SAMPLE TIME:</b> 1642
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b>		

## PURGING DATA

<b>Well Type:</b> PVC	<b>Pump: (S/N):</b> PER/STATIC LINE 19553	<b>Total Well Depth (feet):</b> 27
<b>Well Diameter (inches):</b> 2"	<b>Water Quality Meter: (S/N):</b> HORIBA U5000	<b>Screen Interval (feet):</b> 17-27
<b>Tubing Diameter (inches):</b> 3/16ID x 0.25OD	<b>Turbidity Meter: (S/N):</b> " " 020894	<b>Static Depth to Water (feet):</b> 14.96
<b>Tubing Material:</b> PTFE (Teflon)	<b>Water Level Indicator: (S/N):</b> SOLINST	<b>Tubing Depth (Begin/End):</b> 23.0
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet -        feet ) X        gallons/foot =        gallons		<b>Volume to be Purged (gallons):</b>
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		<b>Total Volume Purged (gallons):</b>

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1535	0.25	0.25	14.96	22.72	9.60	1.43	9.87	-161	65.3	RED/RUST
1542	0.5	0.75	14.98	25.52	10.1	0.69	9.77	-185	570	RUST
1552	0.75	1.50	14.98	28.26	10.5	0.43	9.72	-201	481	RUST
1558	0.75	2.25	14.98	21.29	11.1	0.68	9.72	-209	412	
1605	0.5	2.75	14.97	21.99	11.1	0.63	9.70	-203	367	
CLEANED PROBE										
1613	0.5	3.25	14.97	22.36	11.0	0.68	9.72	-188	65.4	
1619	0.5	3.75	14.77	22.25	11.0	0.36	9.71	-204	54.1	
1627	0.75	4.5	14.96	22.54	11.0	0.37	9.71	-202	47.4	
1635	0.5	5.0	14.96	22.58	11.0	0.33	9.72	-202	41.3	
1640	0.5	5.5	14.96	22.55	11.0	0.34	9.73	-203	41.5	
									39.6	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

<b>Field Filtered:</b> Yes/ No	<b>Filter Size:</b> _____	<b>Duplicate:</b> Yes/ No	<b>Duplicate ID:</b> _____	<b>Time:</b> _____	<b>MS/MSD:</b> Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>8/27/13</b>
WELL NO: <b>SM5MW7A</b>	SAMPLE ID: <b>SM5MW7A</b>	SAMPLE TIME: <b>1030</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Well Type: <b>PVC</b>	Pump: (S/N): <b>PERI PUMP# 019994</b>	Total Well Depth (feet): <b>23.0</b>
Well Diameter (inches): <b>2"</b>	Water Quality Meter: (S/N): <b>HANNA U-5000</b>	Screen Interval (feet): <b>13-23</b>
Tubing Diameter (inches): <b>3/16ID x 0.250D</b>	Turbidity Meter: (S/N): <b>020894</b>	Static Depth to Water (feet): <b>16.25</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>SOLINST 2020</b>	Tubing Depth (Begin/End): <b>16.25</b>
<b>1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity</b> = (        feet        -        feet ) X        gallons/foot        =        gallons		
Purge Method: Traditional Multiple Volume Purge ("Slipping from the Top") or Low-Flow ("Tubing in Mid Screen")		
		Volume to be Purged (gallons):
		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (µS/cm or ms/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
0851	0.25	0.25	16.35	21.38	>100.0	1.02	5.85	235	★	CLOUDY
0912	0.75	1.0	16.4	20.12	>100.0	0.70	5.98	219	★	CLOUDY
0923	0.5	1.5	16.40	20.36	>100.0	0.57	6.03	218	484	CLOUDY
0935	0.5	2.0	16.40	20.54	>100.0	0.56	6.01	223	280	
0952	0.5	2.5	16.41	21.01	>100.0	0.50	6.11	221	214	
1013	0.75	3.25	16.42	21.50	>100.0	0.48	6.14	222	6.10★	
1028	0.5	3.75	16.41	22.01	>100.0	0.50	6.16	222	4.96	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
-------------------------	--------------------	--------------------	---------------------	-------------	-----------------

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

★ TURBIDITY BLINKING 0.00. WATER CLOUDY ESTIMATED TURB. <100  
 @1010 LAMOTTE 2020 WE BROUGHT IT ONSITE AND CALIBRATED

SAMPLER(S) SIGNATURE: \_\_\_\_\_





# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 8/27/13
WELL NO: SAS MW 7B	SAMPLE ID:	SAMPLE TIME: 1105
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type: <b>Prc</b>	Pump: (S/N): <b>PERI PINE # 019553</b>	Total Well Depth (feet): <b>40</b>
Well Diameter (inches): <b>2"</b>	Water Quality Meter: (S/N): <b>HOLBA 019351</b>	Screen Interval (feet): <b>30-40</b>
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N): <b>LAMORTE 2020 WE 019296</b>	Static Depth to Water (feet): <b>17.83</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>Sou nest</b>	Tubing Depth (Begin/End): <b>~36.0</b>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (                feet -                feet) X                gallons/foot =                gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

**Well Capacity (Gal/Ft):** 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
**Stabilizing Criteria Range:** Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/l or 10% saturation, pH:  $\leq 0.1$  unit; Turbidity:  $\leq 10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: ____	Duplicate: Yes/ No	Duplicate ID: ____	Time: ____	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

**SAMPLER(S) SIGNATURE:**



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>8/27/13</b>
WELL NO: <b>Sms mw 12B</b>	SAMPLE ID: <b>Sms mw 12B</b>	SAMPLE TIME: <b>1532</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Well Type: <b>PVC</b>	Pump: (S/N): <b>GEO SUB</b>	Total Well Depth (feet): <b>62</b>
Well Diameter (inches): <b>2"</b>	Water Quality Meter: (S/N): <b>170219A</b> <b>U5000</b> <b>PW8 020894</b>	Screen Interval (feet): <b>52-62</b>
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N): <b>LA MOTTE 20204E</b>	Static Depth to Water (feet): <b>58 32.64</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>SOLINEST</b>	Tubing Depth (Begin/End): <b>58</b>

**1 WELL VOLUME PURGE** = (Total Well Depth - Static Depth to Water) X Well Capacity  
= (        feet        -        feet        ) X        gallons/foot        =        gallons

**Purge Method:** Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")

Volume to be Purged (gallons):  
Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1321	0.75	0.75	33.12	18.00	3.64	0.82	7.63	52	2750	ORANGE
1327	1.25	2.0	33.08	18.93	3.13	0.67	7.27	77	1720	
1341	1.00	3.00	33.04	20.20	2.72	0.57	7.25	92	152	
1356	1.00	4.0	33.04	20.09	2.50	0.48	7.26	88	74	
1410	1.00	5.0	33.04	20.27	2.38	0.42	7.25	68	140	
1422	1.0	6.0	33.04	20.63	2.30	0.39	7.25	61	109.8	
1435	1.0	7.0	33.04	20.21	2.23	0.36	7.20	59	42.3	
1449	1.0	8.0	33.04	20.05	2.17	0.34	7.20	57	19.3	
1502	1.0	9.0	33.04	20.37	2.12	0.34	7.18	50	13.0	
1516	1.0	10.0	33.04	20.15	2.10	0.32	7.20	45	11.28	
1529	1.0	11.0	33.04	20.31	2.08	0.30	7.21	42	9.62	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/ No    Filter Size: _____	Duplicate: Yes/ No    Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)			

**SAMPLER(S) SIGNATURE:**



# Historic Purge and Well Information

Well ID	Screen Interval	June 2013 DTW	Purge time	Pump	Comment	Final Turb.	
✓ 01A	30-40	37	<1 hr	Sub	draws down	57	31.71
✓ 02A	17-27	14	<1 hr	Peris.	good recharge	6.5	14.96
03B	56-66	38	2 hr	Sub	draws down	100	32.98
04A	33-43	41	1 hr	Sub	draws down	236	37.35.90
✓ 07A	13-23	21	2.2	Sub	dry	13	16.23
✓ 07B	30-40	23	4 hrs	Sub	slow recharge	150	17.83
08A	25-35	26	1.7 hr	Sub		>1000	21.88
✓ 10A	22-32	18.5	1 hr	Peris.		9.4	<del>23.57</del> 23.16
✓ 10B	60-70	29	1.5 hr	Sub		8.8	23.10
11A	15-30	3.6	3.5 hr	Peris.		7.2	5.70
11B	41-56	5.9	2.0 hr	Peris.		2.9	7.70
✓ 12A	24-40	30.5	1.5 hr	Sub		2.3	32.77
✓ 12B	52-62	29.8	4.5 hr	Sub	good recharge	10.1	32.69
✓ 13A	20-30	20.1	2 hrs	Sub		5.2	<del>28.60</del> 28.62
✓ 13B	56-71	25	1.2 hr	Sub		7.2	31.53

1A } Bladder pump  
4A }  
3B }

8/26 10A 23.77  
10B 23.33  
13A 28.77  
13B 31.70



# **SMOKEY MOUNTAIN SMELTERS**

**Knoxville, Knox County, Tennessee**

**August 2013**

**Quarterly Event 1**

**Remedial Investigation / Feasibility Study**

**Groundwater Sampling Log**

**Book 2 of 3**



**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**



# INSTRUMENT AND CALIBRATION LOG

Site Name: \_\_\_\_\_

Sampling Event: \_\_\_\_\_

Instrument/Meter Manufacturer: \_\_\_\_\_

Type of Instrument: ~~Water~~ Water quality ? ☐ Air Monitor ? ☐

Model # U-53

Manufacturer Serial # PINE 020374 / 019119

		Instrument Readings						
Calibration Date	Time	Parameter Calibrating	Bump reading	Ok to use?	Signature	Calibrated Reading	End of Day Bump readings	Initial
8/26/13	0859	PH			<i>A. Grunke</i>	4.0	4.14	AG
	0859	COND			<i>A. Grunke</i>	4.49	4.64	AG
	0859	DO			<i>A. Grunke</i>	10.0	99.2 %	AG
	0859	TURB			<i>A. Grunke</i>	0.0	0.0	AG
8/27/13	0804	PH			<i>A. Grunke</i>	4.01	4.05	AG
		COND				4.48	10.8	
		DO				112.0	122.118.9	
		TURB				0.0	10.0	
8/28/13	0830	4PH			<i>J. W.</i>	4.01	4.17	JW
		4.49 cond				4.49	4.71	
		0NTU				0.0	6.3 NTU	
		DOMSL				8.98	7.47	
8/28/13	0835	4PH			<i>A. Grunke</i>	4.0	4.18	JW
		4.49 COND				4.49	4.78	
		0NTU				0.0	--	
		DOMSL				10.69	10.56	
8/29/13	0745	4PH			<i>J. W.</i>	4.02	4.00	
		4.49 cond				4.52	4.48	
		0NTU				0.00	16.3 *	
		DOMSL				26.7	8.17	
Used Lamotte 2020ve		10NTU				10.0		
		20NTU				19.1		

US3 AMF  
PINE 019315

US3 HORIBA  
PINE 19119

US3 Horiba  
024044





# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site		SITE LOCATION: Knoxville, Tennessee		DATE: 8-26-13	
WELL NO: MW 10B		SAMPLE ID: SMSMW10B		SAMPLE TIME: 1145	
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:					

## PURGING DATA

Well Type: <b>PVC</b>	Pump: (S/N): <b>Sub Peristaltic Pine SN</b>	Total Well Depth (feet): <b>70</b>
Well Diameter (inches): <b>2"</b>	Water Quality Meter: (S/N): <b>U-53 Horiba 00193</b>	Screen Interval (feet): <b>60-70</b>
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b> ✓	Turbidity Meter: (S/N): <b>Pine SN 021143</b>	Static Depth to Water (feet): <b>23, 33</b>
Tubing Material: <b>PTFE (Teflon)</b> ✓	Water Level Indicator: (S/N): <b>Solinst Pine S/N 007620</b>	Tubing Depth (Begin/End): <b>63'</b>

$$\text{1 WELL VOLUME PURGE} = (\text{Total Well Depth} - \text{Static Depth to Water}) \times \text{Well Capacity}$$

$$= (\text{feet} - \text{feet}) \times \text{gallons/foot} = \text{gallons}$$

Volume to be Purged (gallons):

Total Volume Purged (gallons):

**Purge Method:** Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0028; 5/16" = 0.004; 3/8" = 0.008; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance:  $\pm 5\%$ ; Dissolved Oxygen:  $\pm 0.2$  mg/L or 10% saturation; pH:  $\pm 0.1$  unit; Turbidity:  $<10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No	Filter Size: _____	Duplicate: Yes/No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No
------------------------	--------------------	-------------------	---------------------	-------------	----------------

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

Routenir

**SAMPLER(S) SIGNATURE:**

Khush



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>8-26-13</b>
WELL NO: <b>MW 10A</b>	SAMPLE ID: <b>SMSMW 10A</b>	SAMPLE TIME: <b>1440</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Well Type: <b>PVC</b>	Pump: (S/N): <b>PERISTALTIC PINE 019994</b>	Total Well Depth (feet): <b>32'</b>
Well Diameter (inches): <b>2"</b>	Water Quality Meter: (S/N): <b>40013A J-5000 019119</b>	Screen Interval (feet)
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N): <b>"</b>	Static Depth to Water (feet): <b>25.07</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>SOLINST</b>	Tubing Depth (Begin/End)
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet        ) X        gallons/foot        =        gallons		Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (ms/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1305	2	2	25.09	19.04	5.75	2.18	3.81	460	14.4	
1311	0.5	2.5	26.30	20.31	5.77	1.90	3.80	460	14.7	
1316	0.5	3.0	26.39	20.99	5.15	1.79	3.81	464	12.5	
1325	0.25	3.25	26.50	24.94	5.33	1.50	3.85	458	12.0	
1335	1.25	4.5	26.68	16.12	5.26	1.36	3.89	466	45.4	
1345	1.25	5.75	26.75	17.03	6.11	1.87	3.79	469	13.6	
1355	1.25	7.00	26.90	20.04	6.14	1.82	3.77	472	60.4	
1400	1.25	8.25	26.85	19.94	6.24	1.82	3.77	472	57.7	
1410	1.25	9.50	26.95	21.13	6.85	1.65	3.77	473	66	
1420	1.25	10.75	26.90	21.96	6.08	1.57	3.78	472	64	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>8-27-13</b>
WELL NO: <b>MW01A</b>	SAMPLE ID: <b>SMS MW01A</b>	SAMPLE TIME: <b>1045</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Well Type: <b>PVC</b>	Pump: (S/N): <b>MP50 / Bladder pump</b>	Total Well Depth (feet): <b>40</b>
Well Diameter (inches): <b>2"</b>	Water Quality Meter: (S/N): <b>Horiba U53, Pine SN 019119</b>	Screen Interval (feet): <b>30-40</b>
Tubing Diameter (inches): <b>3/16ID x 0.250D</b>	Turbidity Meter: (S/N): <b>Horiba "</b>	Static Depth to Water (feet): <b>31.71</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>Solinst 100' Pine SN 019014</b>	Tubing Depth (Begin/End): <b>~33</b>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet ) X        gallons/foot        =        gallons		Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (ms/cm) or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
0940	0.5	0.5	32.07	18.92	82	5.0	6.44	187	144	No / brownish
0950	0.5	1.0	32.10	19.34	85	4.6	6.45	189	122	No / "
1005	0.5	1.5	32.12	20.07	87	4.2	6.46	190	95	No / "
1020	0.5	2.0	32.12	20.63	88	4.0	6.47	190	76	" "
1030	0.5	2.5	32.13	21.18	88	3.8	6.46	189	64	" "
1040	0.25	2.75	32.13	21.38	88	3.7	6.46	190	57	" "
1045	0.20	3.0	32.13	21.68	87	3.6	6.46	190	54	" "

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/No <input checked="" type="checkbox"/> No	Filter Size: _____	Duplicate: Yes/No <input checked="" type="checkbox"/> No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No <input checked="" type="checkbox"/> No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.) <div style="text-align: center; font-size: 1.2em; margin-top: 10px;">           Routine Low flow / low stress mid-screen intake placement         </div>					

SAMPLER(S) SIGNATURE: \_\_\_\_\_

J. H. [Signature]



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>8/28/13</b>
WELL NO: <b>SMS MW 04A</b>	SAMPLE ID: <b>SMS MW 04A</b>	SAMPLE TIME: <b>1231</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Well Type: <b>PVC</b> Well Diameter (inches): <b>2"</b> Tubing Diameter (inches): <b>3/16ID x 0.25OD</b> Tubing Material: <b>PTFE (Teflon)</b>	Pump: (S/N): <b>RED BLADDER PINE 21847</b> Water Quality Meter: (S/N): <b>HORIBA U53</b> Turbidity Meter: (S/N): <b>024044</b> <b>LA MOTTE 2020 W&amp;E</b> Water Level Indicator: (S/N): <b>SOLIN ST</b>	Total Well Depth (feet): <b>43</b> Screen Interval (feet): <b>33-43</b> Static Depth to Water (feet): <b>35.72</b> Tubing Depth (Begin/End): <b>~40.0</b>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet        ) X        gallons/foot        =        gallons		Volume to be Purged (gallons): Total Volume Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1029	0.25	0.25	36.06	24.21	25.1	5.68	5.71	286	132	
1040	0.5	0.75	36.12	22.36	23.6	4.92	5.91	240	82	
1054	0.25	1.0	36.15	22.25	24.0	6.00	5.98	217	52.7	
1113	0.5	1.5	36.19	22.04	24.1	3.89	6.08	205	39.8	
1129	0.5	2.0	36.19	22.20	25.0	4.66	6.15	199	24.9	
1140	0.25	2.25	36.19	22.20	24.6	4.70	6.20	193	17.8	
1150	0.25	2.5	36.17	23.07	24.3	3.36	6.19	196	14.3	
1204	0.25	2.75	36.18	22.56	24.6	3.39	6.22	197	12.5	
1215	0.25	3.0	36.17	23.11	24.6	4.61	6.27	197	12.01	
1227	0.25	3.25	36.17	22.49	25.1	4.50	6.31	194	9.56	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

SAMPLER(S) SIGNATURE:
-----------------------





# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 2/28/13
WELL NO: 5msmw11B	SAMPLE ID: 545mw11B	SAMPLE TIME: 1510
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type: <b>PVC</b>	Pump: (S/N): <b>PERISTALTIC PINE 1953</b>	Total Well Depth (feet): <b>56</b>
Well Diameter (inches): <b>2"</b>	Water Quality Meter: (S/N): <b>HOLIBA J53 019351</b>	Screen Interval (feet): <b>41 <del>55</del> 56</b>
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N): <b>LAMORTE 2020WE 09296</b>	Static Depth to Water (feet): <b>7.10</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>SOLINEX</b>	Tubing Depth (Begin/End): <b>~ 50</b>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (                      feet                      ) X                      gallons/foot                      =                      gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.85; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilizing Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\pm 0.1$  unit; Turbidity:  $\leq 10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**





## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 8/29/13
WELL NO: MW08A	SAMPLE ID: SMSMW08A	SAMPLE TIME: 1005
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: Hazy / Warm		

## PURGING DATA

Well Type: Flush	Pump: (S/N): Geosub pump	Total Well Depth (feet): 35
Well Diameter (inches): 2 1/2	Water Quality Meter: (S/N): Horba 024044	Screen Interval (feet): 21.98
Tubing Diameter (inches): 3/16 ID x 0.250 OD	Turbidity Meter: (S/N): Lamotte 2020 WE 019296	Static Depth to Water (feet): 25-35
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N): Solinst	Tubing Depth (Begin/End): Mid screen
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = (feet - feet) X gallons/foot = gallons		Volume to be Purged (gallons): 10 Static
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
0805		0.5	22.50	21.07	7.75	1.02	8.51	-131	739	Rust/clarify
0811	1.0	1.5	22.75	20.40	7.79	0.19	8.50	-152	1966	RUST
0816	0.0	2.5	22.79	20.54	7.87	0.22	8.49	-151	1265	" slow pump
0827	1.0	3.5	22.51	21.66	8.05	0.09	8.49	-122	844	
0834	0.5	4.0	22.49	21.73	8.10	0.09	8.49	-235	635	
0839	0.5	4.5	22.49	21.69	8.12	0.09	8.50	-241	1257	
0845	0.5	5.0	22.49	21.69	8.15	0.11	8.50	-245	125	
0851	0.5	5.5	22.49	21.68	8.18	0.13	8.51	-243	109	
0857	0.5	6.0	22.49	21.71	8.21	0.14	8.51	-245	93.3	
0903	0.5	6.5	22.51	21.64	8.28	0.18	8.52	-250	77.8	slow pump
0922	1.0	7.5	22.47	22.48	8.32	0.12	8.52	-191	44.7	
0945	2.5	8.5	22.46	22.74	8.36	0.10	8.53	-176	18.3	
1004	0.75	9.25	22.46	22.58	8.40	0.10	8.55	-167	9.52	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0028; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No	Filter Size: _____	Duplicate: Yes/No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No
------------------------	--------------------	-------------------	---------------------	-------------	----------------

NOTES: (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

SAMPLER(S) SIGNATURE: \_\_\_\_\_



Historic Purge  
and Well Information

*Dore*

*DTW*

Well ID	Screen Interval	June 2013 DTW	Purge time	Pump	Comment	Final Turb.	
01A ✓	30-40	37	<1 hr	Sub		57	31.71
02A ✓	17-27	14	<1 hr	Peris.	draws down	6.5	14.96
03B	56-66	38	2 hr	Sub	good recharge	100	32.98
04A	33-43	41	1 hr	Sub	draws down	236	35.90
07A ✓	13-23	21	2.2	Sub	dry	13	16.23
07B ✓	30-40	23	4 hrs	Sub	slow recharge	150	17.83
08A	25-35	26	1.7 hr	Sub		>1000	21.88
10A ✓	22-32	18.5	1 hr	Peris.		9.4	23.16
10B ✓	60-70	29	1.5 hr	Sub		8.8	23.18
11A	15-30	3.6	3.5 hr	Peris.		7.2	5.70
* 11B	41-56	5.9	2.0 hr	Peris.		2.9	7.70
* 12A	24-40	30.5	1.5 hr	Sub		2.3	32.77
* 12B	52-62	29.8	4.5 hr	Sub	good recharge	10.1	32.69
* 13A ✓	20-30	20.1	2 hrs	Sub		5.2	28.62
13B ✓	56-71	25	1.2 hr	Sub		7.2	31.53

1A } Bladder pump  
3B }  
4A }

mg/L Fe	Sample Date	Sample Time
0.00 - 01A	8/27	1045
- 02A	8/26	1642
- 03B		
- 04A		
- 07A		
- 07B		
- 08A		
- 10A	8/26	22 1145 1440
0.11 - 10B	8/26	22 1440 1145
- 11A		
- 11B		
0.04 - 12A		
- 12B		
0.64 - 13A	NS	
- 13B	8/26	1132 Turbid Fe/clean.
0.00 - SW20		
0.00 - SW05		
0.00 - SW10		

Fe <sup>2+</sup>	
SW01	0.12
SW04	0.03
SW12	0.04
SW08	0.06
SW08S	0.09
SW03	0.00
SW11	0.00



**SMOKEY MOUNTAIN SMELTERS**  
Knoxville, Knox County, Tennessee

**November 2013**

**Quarterly Event 2**

**Remedial Investigation / Feasibility Study**

**Groundwater Sampling Log**

**Book 1 of 3**



**J.M.WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**



Historic Purge  
and Well Information  
Fe+ 2 Results

Well ID	Screen Interval	June 2013 DTW	August 2013 DTW	Nov 2013 DTW	Purge time	Pump	Comment
01A	30-40	37	31.7	35.10	<1 hr	Sub	draws down
02A	17-27	14	14.96	16.28	<1 hr	Peris.	good recharge
03B	56-66	38	32.98	35.20	2-3 hr	Sub	draws down
04A	33-43	41	35.9	39	1-2 hr	Sub	draws down
07A	13-23	21	16.25	19.20	1.5-2 hr	Sub	dry
07B	30-40	23	17.83	21.65	1.5-4 hrs	Sub	slow ⇒
08A	25-35	26	22	24.55	1.7 hr	Sub	some
10A	22-32	18.5	25.1	29.40	1.5 hr	Peris.	slow ⇒
10B	60-70	29	23.3	27.80	1.5 hr	Sub	some
11A	15-30	3.6	5.7	<del>11.35</del> 11.35	1 hr	Peris.	good recharge
11B	41-56	5.9	7.7	10.38	0.5	Peris.	good recharge
12A	24-40	30.5	32.7	32.7	2.0 hr	Sub	some
12B	52-62	29.8	32.69	37.60	2-4 hr	Sub	good recharge
13A	20-30	20.1	28.6	<del>38.20</del> 39.70	2 hrs	Sub	slow or dry
13B	56-71	25	31.7	38.20	1.2 hr	Sub	slow

Groundwater Fe+2

Surface water Fe+2

Fe+2	dilution?	Result	Fe+2	dilution?	Result
01A			SW01		
02A			SW02		
03B			SW03		
04A		0.06	SW04		
07A			SW05		
07B			SW08		
08A		0	SW08 spring		
10A			SW09		
10B		0.38	SW09 spring		
11A			SW10		
11B		0	SW11		
12A			SW12		
12B			SW13		
13A			SW14		
13B			SW20		





MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS

Site Name: SMOKEY MOUNTAIN SMELTERS

[illegible]



# GROUNDWATER SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelter Site	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 11/12/13
<b>WELL NO:</b> 11B	<b>SAMPLE ID:</b> MW11B	<b>SAMPLE TIME:</b> 9:40
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b> COLD, CLOUDY, WINDY		

## PURGING DATA

<b>Well Type:</b>	<b>Pump:</b> (S/N): 04L1385AM YSI	<b>Total Well Depth (feet):</b> 56
<b>Well Diameter (inches):</b>	<b>Water Quality Meter:</b> (S/N):	<b>Screen Interval (feet):</b> 41-56
<b>Tubing Diameter (inches):</b> 3/16ID x 0.250D	<b>Turbidity Meter:</b> (S/N): 11120C01483 Hach 2100a	<b>Static Depth to Water (feet):</b> 11.28
<b>Tubing Material:</b> PTFE (Teflon)	<b>Water Level Indicator:</b> (S/N): 201301 Solinst	<b>Tubing Depth (Begin/End):</b> 46
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet -        feet ) X        gallons/foot =        gallons		<b>Volume to be Purged (gallons):</b>
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		<b>Total Volume Purged (gallons):</b>

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
8:44	.25	.25	11.28	14.56	15.92	0.79	8.36	215.2	52.4	Clear/Sulfur smell
8:54	.50	.50	11.45	14.38	15.20	0.76	8.47	223.8	3.48	"
9:02	.25	.75	11.51	14.49	15.18	1.35	8.48	225.4	2.52	"
9:08	.25	1.00	11.54	14.29	15.20	2.23	8.48	220.5	0.59	"
9:17	.50	1.50	11.56	14.26	15.16	1.53	8.49	209.1	0.50	"
9:27	.50	2.00	11.58	14.36	15.15	1.41	8.48	193.8	0.48	"
9:36	.50	2.50	11.60	14.29	15.20	3.37	8.48	190.6	0.59	"

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

<b>Field Filtered:</b> Yes/ No <b>Filter Size:</b>	<b>Duplicate:</b> Yes/ No <b>Duplicate ID:</b>	<b>Time:</b>	<b>MS/MSD:</b> Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)			

<b>SAMPLER(S) SIGNATURE:</b>
------------------------------



## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 11/2/13
WELL NO: 12A	SAMPLE ID: MW12A	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: COLD, CLOUDY, WINDY		

## PURGING DATA

Well Type:	Pump: (S/N): <del>0441385</del> AM geotek 20611	Total Well Depth (feet): 40
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet) 24-40
Tubing Diameter (inches): 3/16ID x 0.25OD	Turbidity Meter: (S/N): 111206014834	Static Depth to Water (feet) <del>65</del> 37.78
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N): 201301 Solinst	Tubing Depth (Begin/End) 32
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (                      feet                      ) X                      gallons/foot                      =                      gallons		Volume to be Purged (gallons):  Total Volume Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\pm 0.1$  unit; Turbidity:  $<10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No	Filter Size:	Duplicate: Yes/No	Duplicate ID:	Time:	MS/MSD: Yes/No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					
11/14/13 1000					
Let recharge, DTW = 37.96, filled 2L and let recharge again.					
Rate appears to be 1L per hour.					
Tubing was removed due to length being cut too short and fell into well.					

**SAMPLER(S) SIGNATURE:**



# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 11/12/13
WELL NO: MW13A	SAMPLE ID: MW 13A	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: COLD, CLOUDY, WINDY		

## PURGING DATA

Well Type:	Pump: (S/N):	Total Well Depth (feet): 30
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet) 20-30
Tubing Diameter (inches): 3/16ID x 0.25OD	Turbidity Meter: (S/N):	Static Depth to Water (feet) —
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N): 201301 SOLJUST	Tubing Depth (Begin/End) 25
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                      feet –                      feet ) X                      gallons/foot =                      gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.008; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\geq 0.1$  unit; Turbidity:  $<10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**



# GROUNDWATER SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelter Site	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 11/12/13
<b>WELL NO:</b> 10B	<b>SAMPLE ID:</b> MW 10B	<b>SAMPLE TIME:</b> 16:55
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b> cold, cloudy, windy		

## PURGING DATA

<b>Well Type:</b>	<b>Pump:</b> (S/N): 024095 gnd cub	<b>Total Well Depth (feet):</b> 32
<b>Well Diameter (inches):</b>	<b>Water Quality Meter:</b> (S/N):	<b>Screen Interval (feet):</b> 32-32
<b>Tubing Diameter (inches):</b> 3/16ID x 0.25OD	<b>Turbidity Meter:</b> (S/N): 111200-01434 Hach	<b>Static Depth to Water (feet):</b> 29.05
<b>Tubing Material:</b> PTFE (Teflon)	<b>Water Level Indicator:</b> (S/N): 201301 solinst	<b>Tubing Depth (Begin/End):</b> 27
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet        ) X        gallons/foot        =        gallons		<b>Volume to be Purged (gallons):</b>
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		<b>Total Volume Purged (gallons):</b>

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
15:20	0.50	0.50	30.36	15.52	1.722	1.80	6.68	76.0	0.0.R.	cloudy
15:33	0.50	1.00	29.39	15.87	1.689	0.93	6.64	70.1	0.0.R.	cloudy
15:40	0.50	1.50	29.40	16.00	1.727	0.80	6.62	69.7	347	cloudy
15:59	1.00	2.50	29.45	15.72	1.795	0.62	6.58	70.1	72.3	cloudy
16:23	1.00	3.50	29.47	16.04	1.880	0.50	6.55	71.3	20.4	clear
16:45	1.00	4.50	29.53	15.90	1.937	0.41	6.53	72.3	5.97	clear

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0008; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

<b>Field Filtered:</b> Yes/ No	<b>Filter Size:</b>	<b>Duplicate:</b> Yes/ No	<b>Duplicate ID:</b>	<b>Time:</b>	<b>MS/MSD:</b> Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**



# GROUNDWATER SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelter Site	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 11/13/13
<b>WELL NO:</b> 8A	<b>SAMPLE ID:</b> MW08A	<b>SAMPLE TIME:</b> 10:45
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b> cold + CLEAR		

## PURGING DATA

<b>Well Type:</b>	<b>Pump: (S/N):</b> Geotach 20617	<b>Total Well Depth (feet):</b> 35
<b>Well Diameter (inches):</b>	<b>Water Quality Meter: (S/N):</b>	<b>Screen Interval (feet):</b> 25-35
<b>Tubing Diameter (inches):</b> 3/16ID x 0.25OD	<b>Turbidity Meter: (S/N):</b> 11060C0100057	<b>Static Depth to Water (feet):</b> 28.54
<b>Tubing Material:</b> PTFE (Teflon)	<b>Water Level Indicator: (S/N):</b> 201301	<b>Tubing Depth (Begin/End):</b> 32
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet ) X        gallons/foot        =        gallons		<b>Volume to be Purged (gallons):</b>
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		<b>Total Volume Purged (gallons):</b>

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
9:29	.50	1.00	25.4	16.77	6.832	1.23	8.80	130.5	0.0-0.2	murky/cloudy
9:33	.50	1.50	25.37	16.80	6.933	1.20	8.80	125.5	0.0-0.2	" "
9:38	.50	2.00	25.39	16.93	7.021	1.22	8.80	118.3	0.0-0.2	" "
9:44	1.00	3.00	25.50	17.25	6.955	0.98	8.79	111.1	" "	" "
9:50	1.00	4.00	25.56	17.23	7.088	1.02	8.78	106.8	0.35	less cloudy
9:56	1.00	5.00	25.53	17.19	7.137	1.01	8.79	99.1	0.72	" "
10:01	1.00	6.00	25.50	17.19	7.189	1.01	8.79	94.5	75.8	" "
10:10	1.00	7.00	25.50	17.20	7.298	0.98	8.80	86.4	41.7	" "
10:15	1.00	8.00	"	17.17	7.331	0.87	8.80	82.6	24.2	clear
10:20	1.00	9.00	"	17.20	7.376	0.81	8.80	80.0	16.7	" "
10:29	1.00	10.00	"	17.17	7.452	0.75	8.80	75.4	11.7	" "
10:37	1.00	11.00	"	17.21	7.472	0.68	8.80	71.1	6.7	" "

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

<b>Field Filtered:</b> Yes/ No	<b>Filter Size:</b> _____	<b>Duplicate:</b> Yes/ No	<b>Duplicate ID:</b> _____	<b>Time:</b> _____	<b>MS/MSD:</b> Yes/ No
--------------------------------	---------------------------	---------------------------	----------------------------	--------------------	------------------------

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

**SAMPLER(S) SIGNATURE:**





J.M. WALLER  
ASSOCIATES, INC.

MANAGING THE VISION® ENVIRONMENTAL | FACILITIES | LOGISTICS

## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 11/13/13
WELL NO: 04X	SAMPLE ID: MW04A	SAMPLE TIME: 15:15
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: CLOUD, Clear		

### PURGING DATA

Well Type:	Pump: (S/N) 20617 geotek	Total Well Depth (feet): 43
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet) 33-43
Tubing Diameter (inches): 3/16ID x 0.250D	Turbidity Meter: (S/N): 110600010007	Static Depth to Water (feet)
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N): 201301 Hach Solinst	Tubing Depth (Begin/End) 40
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet ) X        gallons/foot        =        gallons		Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
13:17	0.50	0.50	40.61	18.41	20.23	1.27	5.77	109.8	39.4	cloudy
13:20	0.50	1.00	39.86	18.31	20.76	0.56	5.75	110.4	8.0	cloudy
13:24	0.50	1.50	39.84	18.30	21.03	0.53	5.75	110.3	74.6	cloudy
13:28	0.50	2.00	39.86	18.35	21.24	0.47	5.74	109.8	59.9	cloudy
13:39	0.50	2.50	"	19.52	22.72	0.49	5.75	107.8	-	"
13:50	0.50	3.00	"	20.35	23.79	0.41	5.76	104.3	45.6	clear
14:02	0.50	3.50	"	21.15	23.95	0.35	5.78	95.2	-	clear
14:10	0.50	4.00	"	18.31	22.08	0.53	5.77	94.5	8.6	"
14:20	1.00	5.00	"	18.11	23.44	0.38	5.75	104.4	59.6	"
14:27	1.00	6.00	"	18.18	24.65	0.36	5.73	106.1	46.7	"
14:42	1.00	7.00	"	18.71	26.74	0.25	5.73	114.6	22.1	"
14:51	1.00	8.00	"	18.21	24.91	0.34	5.76	108.9	22.0	"
15:00	1.00	9.00	"	18.18	26.64	0.23	5.74	114.0	14.6	"

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation; pH: ± 0.1 unit; Turbidity: <10 NTU

15:09	1.00	10.00	"	18.20	27.83	0.20	5.76	115.9	7.2	"
-------	------	-------	---	-------	-------	------	------	-------	-----	---

### FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
-------------------------	--------------------	--------------------	---------------------	-------------	-----------------

NOTES: (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

SAMPLER(S) SIGNATURE: \_\_\_\_\_





# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 11/13/13
WELL NO: 02A	SAMPLE ID: MW02A	SAMPLE TIME: 11:07
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type:	Pump: (S/N):	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet)
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet)
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End)
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                      feet –                      feet) X                      gallons/foot =                      gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

**Well Capacity (Gal/Ft):** 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
**Stabilization Criteria Range:** Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\leq 11$ ; Turbidity:  $< 10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**



**SMOKEY MOUNTAIN SMELTERS**  
Knoxville, Knox County, Tennessee

**November 2013**

**Quarterly Event 2**

**Remedial Investigation / Feasibility Study**

**Groundwater Sampling Log**

**Book 2 of 3**



**J.M.WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**



Historic Purge  
and Well Information  
Fe+ 2 Results

Well ID	Screen Interval	June 2013 DTW	August 2013 DTW	Nov 2013 DTW	Purge time	Pump	Comment
01A	30-40	37	31.7		<1 hr	Sub	draws down
02A	17-27	14	14.96		<1 hr	Peris.	good recharge
03B	56-66	38	32.98		2-3 hr	Sub	draws down
04A	33-43	41	35.9		1-2 hr	Sub	draws down
07A	13-23	21	16.25		1.5-2 hr	Sub	dry
07B	30-40	23	17.83		1.5-4 hrs	Sub	slow
08A	25-35	26	22		1.7 hr	Sub	some
10A	22-32	18.5	25.1		1.5 hr	Peris.	slow
10B	60-70	29	23.3		1.5 hr	Sub	some
11A	15-30	3.6	5.7		1 hr	Peris.	good recharge
11B	41-56	5.9	7.7		0.5	Peris.	good recharge
12A	24-40	30.5	32.7		2.0 hr	Sub	some
12B	52-62	29.8	32.69		2-4 hr	Sub	good recharge
13A	20-30	20.1	28.6		2 hrs	Sub	slow or dry
13B	56-71	25	31.7		1.2 hr	Sub	slow

Groundwater Fe+2

Fe+2 dilution? Result

01A	.01
02A	
03B	
04A	
07A	
07B	
08A	
10A	
10B	
11A	0
11B	
12A	
12B	.31
13A	
13B	.19

Surface water Fe+2

Fe+2 dilution? Result

SW01	
SW02	
SW03	
SW04	
SW05	
SW08	
SW08 spring	
SW09	
SW09 spring	
SW10	
SW11	
SW12	
SW13	
SW14	
SW20	





## INSTRUMENT AND CALIBRATION LOG

Instrument Readings							Instrument Type/Manufacturer	Serial Number
Date	Parameter	Calibration Value	Time	Bump Test Value	Time	Signature		
11-12	ORP 241	280	8:15					13038
	pH 10	10	8:18					
	pH 4	4	8:10					
	1.413	1.413					YSI	
11-13	1.413 conc	1.406	8:18			ST	YSI	103038
	7.0 pH	6.91						
	240 ORP	247						
11-14	240 ORP	241				ST	YSI	103038
	1.43 conc	1.44						
	7.0 pH	7.0						
	4.0 pH	4.1						





MANAGING THE VISION® ENVIRONMENTAL | FACILITIES | LOGISTICS

# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 11-12-13
WELL NO: 11-A	SAMPLE ID:	SAMPLE TIME: 9:00
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type:	Pump: (S/N): 3220	Total Well Depth (feet):
Well Diameter (inches): 2	Water Quality Meter: (S/N): 13098	Screen Interval (feet) 15-30
Tubing Diameter (inches): 3/16ID x 0.25OD	Turbidity Meter: (S/N):	Static Depth to Water (feet) 8.45
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N): 210142	Tubing Depth (Begin/End)
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (                      feet -                      feet ) X                      gallons/foot =                      gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: < 5%; Dissolved Oxygen: > 0.2 mg/L or 10% saturation, pH: < 0.1 unit; Turbidity: < 10 NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: <b>9:25</b>	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: _____
WELL NO: <b>12B</b>	SAMPLE ID: _____	SAMPLE TIME: <b>13213</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: _____		

### PURGING DATA

Well Type: _____	Pump: (S/N): <b>4423</b>	Total Well Depth (feet): <b>61</b>
Well Diameter (inches): _____	Water Quality Meter: (S/N): <b>13038</b>	Screen Interval (feet): <b>46/61</b>
Tubing Diameter (inches): <b>3/16ID x 0.250D</b>	Turbidity Meter: (S/N): <b>72208</b>	Static Depth to Water (feet): _____
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>903812</b>	Tubing Depth (Begin/End): _____
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet        ) X        gallons/foot        =        gallons		Volume to be Purged (gallons): _____
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons): _____

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1205	—	—	37.65	15.74	2.675	3.40	7.56	150.1		
1209	.5	.5	37.70	15.63	2.651	0.92	7.06	142.0	EO	
1213	.75	.75	37.70	15.54	2.626	0.96	6.89	140.4	3019 AU	
1220	1.27	1.27	37.70	16.24	2.977	0.49	6.86	140.7	1151 AU	
1225	1.5	1.5	37.7	16.20	2.54	0.46	6.84	139.1	753	
1228	1.25	1.25	37.70	16.18	2.539	0.42	6.82	138	631	
1235	1.50	2.25	37.70	16.25	2.485	0.35	6.81	138	40	
1239	1.25	2.5	37.70	16.31	2.436	0.31	6.80	138.6	19	610 AU
1246	1.5	3.0	37.7	16.29	2.472	0.27	6.79	138	19	
1245	1.5	3.5	37.7	16.25	2.302	0.25	6.78	137.9	17	
1250	1.5	4.0	37.7	16.37	2.295	0.24	6.78	137.6	42	
1256	1.5	4.5	37.7	16.36	2.25	0.21	6.77	137	10	
1300	1.5	5.0	37.7	16.42	2.24	0.20	6.78	137.5	3	

*Pump  
Consider  
57  
46*

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

1310 1.5 5.5 37.70 16.42 2.24 0.20 6.78 137.5 3  
 FIELD SCREENING SUMMARY 6.72 135.8 4

Field Filtered: Yes/No	Filter Size: _____	Duplicate: Yes/No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No
------------------------	--------------------	-------------------	---------------------	-------------	----------------

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

SAMPLER(S) SIGNATURE: \_\_\_\_\_



# GROUNDWATER SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelter Site	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 11.12.3
<b>WELL NO:</b> 13B	<b>SAMPLE ID:</b>	<b>SAMPLE TIME:</b>
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b>		

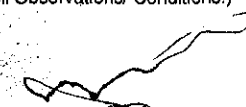
## PURGING DATA

<b>Well Type:</b>	<b>Pump: (S/N):</b> 20879	<b>Total Well Depth (feet):</b> 72
<b>Well Diameter (inches):</b> 2	<b>Water Quality Meter: (S/N):</b> 13038	<b>Screen Interval (feet):</b>
<b>Tubing Diameter (inches):</b> 3/16ID x 0.25OD	<b>Turbidity Meter: (S/N):</b> 10007	<b>Static Depth to Water (feet):</b>
<b>Tubing Material:</b> PTFE (Teflon)	<b>Water Level Indicator: (S/N):</b> A03812	<b>Tubing Depth (Begin/End):</b>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet        ) X        gallons/foot        =        gallons		<b>Volume to be Purged (gallons):</b>
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		<b>Total Volume Purged (gallons):</b>

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
2:45	—	—	38.12	14.50	777	3.511	7.47	101	OVER	RANGE
2:55	.5	.5	38.50	14.51	780	0.82	7.03	25.8	364	
3:00	.5	1.0	38.50	15.82	772	0.42	7.09	16.3	209	
3:05	.5	1.5	38.50	16.10	767	0.33	7.07	8.5	138	
3:10	.5	2.0	38.50	16.02	767	.29	7.07	8.5	108	
3:15	.5	2.5	38.50	16.18	770	.26	7.00	2.3	121	
3:20	.25	2.75	38.50	16.40	771	.25	6.98	2.3	99.6	
3:25	.25	3.0	38.50	16.15	770	.23	6.98	0.7	82	
3:30	.25	3.25	38.50	16.06	771	.22	6.96	-2.2	65	
3:35	.25	3.5	38.50	16.08	770	.20	6.97	-2.0	68	
3:40	.25	3.75	38.50	15.97	772	.18	6.95	-2.8	65	
3:45	.25	4.0	38.50	15.99	772	.17	6.94	-2.9	65	
3:50	.25	4.25	38.50	15.86	771	.18	6.96	-3.0	53	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

<b>Field Filtered:</b> Yes/ No	<b>Filter Size:</b> _____	<b>Duplicate:</b> Yes/ No	<b>Duplicate ID:</b> _____	<b>Time:</b> _____	<b>MS/MSD:</b> Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					
					

<b>SAMPLER(S) SIGNATURE:</b>
------------------------------





## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE:
WELL NO: 13B	SAMPLE ID:	SAMPLE TIME: 4:40
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type:	Pump: (S/N):	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet)
Tubing Diameter (inches): 3/16ID x 0.25OD	Turbidity Meter: (S/N):	Static Depth to Water (feet)
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N):	Tubing Depth (Begin/End)
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet -        feet ) X        gallons/foot =        gallons		Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
355	2.25	4.75	38.5	15.80	775	0.17	6.93	-3.3	57.9	
400	1.25	5.00	38.5	16.07	774	.15	6.93	-2.6	33.2	
405	.25	5.25	38.5	16.08	774	.14	6.93	-2.1	21.2	
410	.25	5.50	38.5	16.06	774	.12	6.93	-1.2	9.6	
415	.25	5.75	38.5	16.08	776	.12	6.92	1.0	9.9	
420	.25	6.0	38.5	16.07	778	.11	6.92	1.3	5.6	
425	.25	6.0	38.5	16.06	780	.11	6.91	1.2	8.6	
430	.25	6.25	38.5	16.08	781	.12	6.91	1.1	8.8	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
-------------------------	--------------------	--------------------	---------------------	-------------	-----------------

NOTES: (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

SAMPLER(S) SIGNATURE: \_\_\_\_\_





# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 11/3/13
WELL NO: 7-B	SAMPLE ID:	SAMPLE TIME: 11:40
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type: 2	Pump: (S/N):	Total Well Depth (feet): 23
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet)
Tubing Diameter (inches): 3/16ID x 0.25OD	Turbidity Meter: (S/N):	Static Depth to Water (feet): 19.45
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N):	Tubing Depth (Begin/End)
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet        ) X        gallons/foot        =        gallons		Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
845	-	-	19.45	13						
850	0.3	0.3	19.65	13.74	497	1.45	6.15	221	0.12	
855	0.3	0.6	19.65	16.71	513	0.87	6.18	214	0.39	
902	0.3	0.9	19.65	17.01	516	0.60	6.18	212	1.96	
907	0.3	1.2	19.65	17.05	524	0.34	6.24	210	1.81	
915	0.4	1.6	19.70	17.16	530	0.26	6.23	209	1.70	
923	0.8	2.5	19.70	17.97	535	0.22	6.18	208	9.0	
930	0.5	3.0	19.70	16.88	542	0.22	6.30	207	47.2	
935	0.5	3.5	19.70	16.81	545	0.21	6.32	207	36.1	
940	0.3	3.8	19.70	16.70	545	0.21	6.32	207	34.2	
949	0.7	4.4	19.70	17.19	551	0.17	6.34	206	28.9	
10:00	0.8	5.2	19.70	17.31	556	0.16	6.36	205	20.5	
10:10	0.8	6.0	19.70	17.52	567	0.13	6.38	204	18.8	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
NOTES: (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

SAMPLER(S) SIGNATURE:

*S. Hays*





# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site		SITE LOCATION: Knoxville, Tennessee	DATE: 11-13-03
WELL NO: 7-B		SAMPLE ID:	SAMPLE TIME: 11:40
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:			

## PURGING DATA

Well Type:	Pump: (S/N):	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet)
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet)
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End)
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                    feet –                    feet) X                    gallons/foot =                    gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation; pH:  $\geq 0.1$  unit; Turbidity:  $< 10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**



## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 11-13-13
WELL NO: 7A	SAMPLE ID:	SAMPLE TIME: 13:15
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Well Type:	Pump: (S/N):	Total Well Depth (feet): 40
Well Diameter (inches):	Water Quality Meter: (S/N):	Screen Interval (feet): 30-40
Tubing Diameter (inches): 3/16ID x 0.25OD	Turbidity Meter: (S/N):	Static Depth to Water (feet): 26.50
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N):	Tubing Depth (Begin/End):
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet        ) X        gallons/foot        =        gallons		Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1200			20.9							
1205	.3	.3	20.9	16.87	10.031	.60	6.06	268.1	503	
1210	.3	.6	21.4	17.00	9.980	.58	6.06	268.1	477	
1215	.3	.9	21.55	17.04	9.84	.56	6.07	208.3	415	
1220	.3	1.2	21.50	17.09	9.61	.16	6.11	206	114	
1225	.3	1.7	21.50	17.41	9.60	.12	6.15	206.0	60.9	
1230	.4	2.1	21.45	17.44	9.53	.11	6.13	205	44.0	
1235	.5	2.6	21.50	17.33	9.50	.10	6.14	205	26.2	
1240	.4	3	21.50	17.33	9.45	.09	6.21	204	19.0	
1245	.5	3.5	21.50	17.25	9.42	.07	6.13	203	11.9	
1250	.5	4.0	21.50	17.26	9.41	.07	6.13	203	9.33	
1255	.5	4.5	21.50	17.27	9.39	.07	6.13	203	7.21	
1300	.5	5.0	21.50	17.28	9.38	.07	6.13	203	6.45	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/ No    Filter Size: _____	Duplicate: Yes/ No    Duplicate ID: _____	Time: _____    MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)		

SAMPLER(S) SIGNATURE: \_\_\_\_\_



14205

3B

Time	Volume Purged	total purge	DTW	Temp	DO	pH	ORP	TURB
1400	—	—	35.15					
1405	.30	.30	38.00	17.96	10.82	.62	5.30	157.1
1410	.45	.75	39.10	18.14	10.69	.32	5.61	154.0
1415	.30	1.05	39.50	18.18	10.15	.25	5.64	150.4
1420	.40	1.45	39.17	17.95	10.62	.20	5.61	145.6
1425	.30	1.75	39.18	18.16	10.65	.16	5.60	143.2
1430	.25	2.0	40.0	18.71	10.61	.13	5.61	139.0
1435	.30	2.30	40.55	18.79	10.52	.11	5.63	136.1
1440	.30	2.60	41.20	18.72	10.53	.09	5.61	132.9
1445	.30	2.90	41.40	18.68	10.57	.08	5.60	130.8
1450	.30	3.20	41.6	18.87	10.61	.08	5.59	129.1
1455	.30	3.50	41.8	18.73	10.6	.07	5.69	126.3
1500	.30	3.80	42.0	18.79	10.63	.07	5.62	124.2
1505	.30	4.10	42.0	18.58	10.65	.07	5.59	122.9
1510	.30	4.40	42.10	18.69	10.64	.069	5.59	122.6
1515	.30	4.70	42.15	18.79	10.65	.06	5.60	121.5
1520	.30	5.00	42.20	18.80	10.65	.06	5.58	120.8
1525	.30	5.30	42.20	18.72	10.68	.06	5.56	119.9
1530	.30	5.60	42.20	18.74	10.68	.06	5.59	116.7
1535	.30	5.90	42.20	18.75	10.67	.06	5.55	116.8
1540	.30	6.20	42.20	18.48	10.71	.05	5.59	114.8
1545	.30	6.50	42.20	18.60	10.69	.05	5.59	114.7
1550	.30	6.80	42.40	18.64	10.7	.05	5.59	113.2
1555	.30	7.1	42.6	18.69	10.73	.05	5.58	112.9
1600	.30	7.4	42.7	18.62	10.75	.05	5.59	111.7
1605	.30	7.7	42.7	18.52	10.75	.05	5.59	109.9
1610	.30	8.0	42.7	18.63	10.75	.05	5.59	110.3

Serial #

13038 YS1

463812 DTW

020147 PUMP

020183 TURB

16120  
sample time



20153 TURB 103038 YSI

IA

963812 DTW  
020147 PUMP  
ORP TURB

10:05	volume	total	DTW	temp	cond	DO	ph	ORP	TURB
10:20 S	—	—	36.4	17.27	4.420	.55	6.44	145	OR.
1010	.4	.4	36.5	17.67	4.68	.51	6.43	146.1	OR
1015	.4	.8	36.6	17.71	4.74	.39	6.44	146	898
1020	.4	1.2	36.6	17.67	4.72	.33	6.44	146	601
1025	.4	1.6	36.6	17.67	4.69	.28	6.45	146	543
1030	.4	2.0	36.6	17.74	4.73	.29	6.44	146.5	394
1035	.4	2.4	36.6	17.77	4.82	.24	6.45	146.7	286
1040	.4	2.8	36.8	17.75	4.92	.28	6.46	146	234
1045	.4	3.2	37.0	17.79	4.91	.23	6.44	146	199
1050	.4	3.6	37.0	18.41	4.99	.33	6.41	147	180
1055	.4	4.0	37.1	18.02	4.98	.17	6.43	146	116
1000	.4	4.4	37.2	17.96	4.96	.17	6.43	146	97.1
1105	.4	4.8	37.2	17.93	4.99	.14	6.43	146	87.0
1110	.4	5.2	37.3	17.97	4.99	.12	6.44	145	73.0
1115	.4	5.5	37.4	18.02	5.00	.11	6.44	145	70.2
1120	.4	5.9	37.4	18.04	5.09	.10	6.43	145	62.3
1125	.4	6.3	37.4	18.05	5.10	.10	6.42	145	58.9
1130	.4	6.7	37.4	18.08	5.11	.10	6.42	145	46.1
1135	.4	7.1	37.4	18.09	5.09	.10	6.41	145	34.7
1140	.4	7.5	37.4	18.11	5.08	.11	6.42	144.7	33.1
1145	.4	7.9	37.4	18.08	5.09	.16	6.41	144	20.9
1150	.4	8.3	37.4	18.01	5.08	.10	6.41	144	16.7
1155	.2	8.5	37.4	18.70	5.20	.12	6.41	145	10.1
1200	.2	8.7	37.04	18.70	5.10	.18	6.42	145.8	6.36
1215	.2	8.9	36.9	18.77	5.14	.12	6.43	145.8	8.90

1220

SAMPLE

MW01A

11/14/13

✓



**SMOKEY MOUNTAIN SMELTERS**  
Knoxville, Knox County, Tennessee

**November 2013**

**Quarterly Event 2**

**Remedial Investigation / Feasibility Study**

**Surface Water Sampling Log**

**Book 3 of 3**



**J.M.WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**





MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS

## INSTRUMENT AND CALIBRATION LOG

Site Name: SMS

[illegible]





J.M. WALLER  
ASSOCIATES, INC.

MANAGING THE VISION | ENVIRONMENTAL | FACILITIES | LOGISTICS

## SURFACE WATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee				DATE: 11/12/13	
SAMPLE ID: SMS5N20						SAMPLE TIME: 850	
Time	Temp. (°C)	Specific Conductance (µS/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
850	10.62	431	10.76	7.02	149.5	28.6	Range : Result:
Stream Flow rate: NA		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No		Duplicate ID:	Time:	MS/MSD: Yes/ No
SAMPLER(S) SIGNATURE: [Signature]							

Notes: Knob Creek Embayment.

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee				DATE: 11/12/13	
SAMPLE ID: SW04						SAMPLE TIME: 142	
Time	Temp. (°C)	Specific Conductance (µS/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
142	8.96	4178	4.03	7.04	54.7	5.53	Range : Result:
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No		Duplicate ID:	Time:	MS/MSD: Yes/ No
SAMPLER(S) SIGNATURE: [Signature]							

Notes:

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee				DATE: 11/12/13	
SAMPLE ID: SMS08						SAMPLE TIME: 232	
Time	Temp. (°C)	Specific Conductance (µS/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
232	8.57	1378	8.5	7.99	81		Range : Result:
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No		Duplicate ID:	Time:	MS/MSD: Yes/ No
SAMPLER(S) SIGNATURE: [Signature]							

Notes:



# SURFACE WATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 11/12/13	
SAMPLE ID: SMS SW 00 Spring				SAMPLE TIME: 223	

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
234	8.7	1.756	886	7.96	84.3		Range : Result:
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No	
SAMPLER(S) SIGNATURE:							

Notes:

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 11/12/13	
SAMPLE ID: SMS SW 09				SAMPLE TIME: 515	

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
1515	10.87	1.5N	7.48	7.91	86.7		Range : Result:
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No	
SAMPLER(S) SIGNATURE:							

Notes:

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 11/12/13	
SAMPLE ID: SMS SW 09 Spring				SAMPLE TIME: 1525	

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
1525	10.10	1.704	8.42	7.94	90.0		Range : Result:
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No	
SAMPLER(S) SIGNATURE:							

Notes:





## SURFACE WATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee				DATE: 11/12/13	
SAMPLE ID: SMSSW01						SAMPLE TIME: 9:15	
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Ferrous Iron (Field Test)
11:15	9.20	0.290	9.54	8.1	78.7		Range :
							Result:
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No		Duplicate ID:	Time:	MS/MSD: Yes/ No
SAMPLER(S) SIGNATURE:							

Notes:

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee				DATE: 11/13/13	
SAMPLE ID: SW13						SAMPLE TIME: 1330	
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
15:15	10.36	836	8.61	7.89	103.6		Range :
							Result:
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No		Duplicate ID:	Time:	MS/MSD: Yes/ No
SAMPLER(S) SIGNATURE:							

Notes:

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee				DATE: 11/13/13	
SAMPLE ID: SW11						SAMPLE TIME: 1355	
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
14:51	8.98	579	10.14	7.33	92.6		Range :
							Result:
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No		Duplicate ID:	Time:	MS/MSD: Yes/ No
SAMPLER(S) SIGNATURE:							

Notes:





## SURFACE WATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 11/13/13				
SAMPLE ID: SW14				SAMPLE TIME: 1420				
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)		Ferrous Iron (Field Test)
1509	8.06	0.774	8.74	7.85	98.2			Range :
								Result:
Stream Flow rate:			Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size: _____	Duplicate: Yes/ No		Duplicate ID: _____	Time:	MS/MSD: Yes/ No	
SAMPLER(S) SIGNATURE:								

Notes:

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 11/13/13				
SAMPLE ID: SW 03				SAMPLE TIME: 1500				
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)		Fe (capsule)
1545	6.59	1.493	4.92	7.75	122.5			Range :
								Result:
Stream Flow rate:			Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size: _____	Duplicate: Yes/ No		Duplicate ID: _____	Time:	MS/MSD: Yes/ No	
SAMPLER(S) SIGNATURE:								

Notes:

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE:				
SAMPLE ID:				SAMPLE TIME:				
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)		Fe (capsule)
								Range :
								Result:
Stream Flow rate:			Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size: _____	Duplicate: Yes/ No		Duplicate ID: _____	Time:	MS/MSD: Yes/ No	
SAMPLER(S) SIGNATURE:								

Notes:



**SMOKEY MOUNTAIN SMELTERS**  
Knoxville, Knox County, Tennessee

**March 2014**

**Quarterly Event 3**

**Remedial Investigation / Feasibility Study**

**Groundwater Sampling Log**

**Book 1 of 3**



**J.M. WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**





MANAGING THE VISION® ENVIRONMENTAL | FACILITIES | LOGISTICS

**Site Name:**

[illegible]

Each instrument will be calibrated using calibration standards provided by the manufacturer or instrument vendor at the beginning of each work day, after battery replacement during each work day, after sensor maintenance during each work day, and after a failed calibration verification. Calibration consists of stabilization and electronic "spanning" of the instrument/sensor response to the calibration standard set via instrument software and manufacturer's instructions. Calibration verification consists of stabilization of the instrument/sensor with the calibration standard set to verify response within +/- 10% of the calibration standard set value. Calibration verification will be performed immediately following calibration, at the end of each instrument use period (ie before turning the instrument off), at initiation of instrument use after restarting (ie after turning the instrument on after a shutdown during the work day), at any time during the work period when instrument readings are suspect, and at any time directed by the FOL. Include the unit of measure, i.e. "mV", "S.U.", "NTU", etc. in the calibration value column. THE FOL WILL REVIEW THIS CALIBRATION LOG AND COMPLETE THE FORM WITH HIS/HER SIGNATURE AT THE END OF EACH WORK DAY.

FOL Name: \_\_\_\_\_

FOL Signature:



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>3/4/14</b>
WELL NO: <b>SMSMW07A</b>	SAMPLE ID: <b>SMSMW07A</b>	SAMPLE TIME: <b>0940</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: <b>Cloudy/30's/ Slight Breeze</b>		

### PURGING DATA

Well Type: <b>PVC</b>	Pump: (S/N): <b>GEOSUB</b>	Total Well Depth (feet):
Well Diameter (inches): <b>2"</b>	Water Quality Meter: (S/N): <b>YSI 556 MPS 023920</b>	Screen Interval (feet):
Tubing Diameter (inches): <b>3/16" x 0.250D</b> <b>3/16"</b>	Turbidity Meter: (S/N): <b>HACH 2100 Q</b>	Static Depth to Water (feet): <b>14.65</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End):
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet -        feet ) X        gallons/foot =        gallons		Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (ms/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
0848	0.5	0.5	14.96	15.32	46.60	2.20	6.13	72.9	72000	
0856	1.0	1.5	15.07	16.21	46.98	0.65	6.19	-5.7	25.6	
0900	2.0	0.5	15.07	16.23	47.00	0.52	6.21	-21.1	154	Orange cloudy
0905	2.5	0.5	14.96	16.23	47.20	0.45	6.23	-26.3	99.3	
0910	0.5	3.0	15.09	15.98	48.01	0.41	6.26	-30.2	65.3	
0917	0.5	3.5	14.96	15.62	48.19	0.41	6.28	-26.5	43.8	
0926	0.5	4.0	14.93	15.05	47.79	0.38	6.28	-24.3	17.9	
0935	0.5	4.5	14.93	16.14	47.57	0.37	6.29	-29.7	9.44	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 6.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/ <b>No</b>	Filter Size: _____	Duplicate: Yes/ <b>No</b>	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ <b>No</b>
NOTES: (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

SAMPLER(S) SIGNATURE: _____
-----------------------------





J.M. WALLER  
ASSOCIATES, INC.

MANAGING THE VISION • ENVIRONMENTAL • FACILITIES • LOGISTICS

## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 3/4/13
WELL NO: SM5MW07B	SAMPLE ID:	SAMPLE TIME: 1152
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Well Type: PVC	Pump: (S/N): 620 SUB 024469	Total Well Depth (feet): 40
Well Diameter (inches): 2"	Water Quality Meter: (S/N): YSI 556 MRS 023920	Screen Interval (feet): 30-40
Tubing Diameter (inches): 3/16ID x 0.250D	Turbidity Meter: (S/N): HACH 2100 Q	Static Depth to Water (feet): 16.44
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N):	Tubing Depth (Begin/End): ~ 47.0

1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity  
= (        feet -        feet ) X        gallons/foot =        gallons

Volume to be Purged (gallons):

Total Volume Purged (gallons):

Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1031	0.5	0.5	16.95	15.89	99.92	0.91	5.84	-31.3	16.85	
1074	0.5	1.0	16.85	15.29	19.46	0.52	5.85	-41.1	30.5	
1040	0.5	1.5	16.71	16.12	98.64	0.39	5.87	-48.5	16.7	
1046	0.5	2.0	16.71	16.11	98.15	0.35	5.88	-49.9	93.3	
1052	0.5	2.5	16.71	16.21	97.68	0.31	5.90	-47.1	81.4	
1058	0.5	3.0	16.71	16.32	97.04	0.28	5.90	-45.1	71.7	
1105	0.5	3.5	16.71	16.26	96.86	0.26	5.91	-51.5	45.7	
1111	0.5	4.0	16.71	16.19	96.57	0.26	5.71	-50.3	34.5	
1117	0.5	4.5	16.74	16.50	96.06	0.24	5.92	-53.0	31.7	
1122	0.5	5.0	16.69	16.17	96.15	0.24	5.91	-52.1	26.3	
1130	0.5	5.5	16.68	16.07	95.99	0.24	5.91	-49.0	20.9	
1149	1.5	7.0	16.66	16.21	95.72	0.23	5.71	-27.9	9.47	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0008; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size:	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No
NOTES: (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

SAMPLER(S) SIGNATURE:





MANAGING THE VISION® ENVIRONMENTAL | FACILITIES | LOGISTICS

-10 four

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 3/5/14
WELL NO: SMSMW02A	SAMPLE ID: 11	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: Low, cold 34°		

## PURGING DATA

Well Type: <i>Flux monitor</i>	Pump: (S/N): <i>902204 peristaltic pump</i>	Total Well Depth (feet): <i>27ft</i>
Well Diameter (inches): <i>2 in</i>	Water Quality Meter: (S/N): <i>YSI 014899</i>	Screen Interval (feet) <i>17-27ft</i>
Tubing Diameter (inches): <i>3/16ID x 0.250D</i>	Turbidity Meter: (S/N): <i>Hach 11090C012514</i>	Static Depth to Water (feet) <i>13.86ft</i>
Tubing Material: <i>PTFE (Teflon)</i> ✓	Water Level Indicator: (S/N): <i>solinst 201494</i>	Tubing Depth (Begin/End) <i>TD-5</i>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (            feet            -            feet ) X            gallons/foot            =            gallons		Volume to be Purged (gallons): <i>To stable</i> Total Volume Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid-Screen")		

[illegible]

Well Capacity (Gal/Ft):	0.75" = 0.02;	1" = 0.04;	1.25" = 0.06;	2" = 0.16;	3" = 0.37;	4" = 0.65;	5" = 1.02;	6" = 1.47;	12" = 5.88
Tubing Inside Diameter Capacity (Gal/Ft):	1/8" = 0.0006;	3/16" = 0.0014;	1/4" = 0.0026;	5/16" = 0.004;	3/8" = 0.006;	1/2" = 0.010;	5/8" = 0.018		
Stabilizing Criteria Range:	Specific Conductance: $\pm 5\%$ ;		Dissolved Oxygen: $\pm 0.2$ mg/L or 10% saturation;		pH: $\pm 0.1$ unit;		Turbidity: $<10$ NTU		

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No	Filter Size: _____	Duplicate: Yes/No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**

HKC





## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 3/3/14
WELL NO: MW10B	SAMPLE ID: <sup>30</sup> SMW1SMSMW10B	SAMPLE TIME: 1450
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Well Type: PVC	Pump: (S/N): Pine 20616 Geo Sub	Total Well Depth (feet): 70
Well Diameter (inches): 2"	Water Quality Meter: (S/N): Pine 011871 YSI MP5556	Screen Interval (feet): 60-70
Tubing Diameter (inches): 3/16ID x 0.25OD	Turbidity Meter: (S/N): Pine 21541 HACH 2100Q	Static Depth to Water (feet): 16.8
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N): Pine 1969 Solinst	Tubing Depth (Begin/End):
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet ) X        gallons/foot        =        gallons		Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or $\mu S/cm$	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1346	0.5	0.5	17.30	14.86	1.525	9.3	6.54	104.4	0.0	milky
1347	0.7	1.25	17.31	15.07	1.481	10.3	6.52	136.9	0.0	milky
1352	0.25	1.50	17.34	15.08	1.465	8.6	6.53	139.0	175	clearing
1355	0.25	1.75	17.26	14.82	1.471	5.9	6.53	138.4	89.5	clearing
1400	0.50	2.25	17.35	15.08	1.472	5.0	6.52	136.6	47.4	clearing
1406	0.50	2.75	17.30	14.88	1.477	4.3	6.52	138.4	26.2	clearing
1412	0.50	3.25	17.30	14.89	1.488	4.0	6.52	126.0	18.3	clear
1419	0.25	3.50	17.30	14.90	1.492	2.0	6.52	118.7	14.7	clear
1423	0.25	3.75	17.30	14.92	1.493	2.0	6.51	118.0	12.4	clear
1429	0.25	4.00	17.30	14.97	1.499	2.4	6.51	115.2	12.1	clear
1435	0.25	4.25	17.30	15.00	1.511	0.6	6.51	114.7	10.3	clear

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance:  $\pm 5\%$ ; Dissolved Oxygen:  $\pm 0.2$  mg/L or 10% saturation; pH:  $\pm 0.1$  unit; Turbidity:  $<10$  NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/No	Filter Size:	Duplicate: Yes/No	Duplicate ID:	Time:	MS/MSD: Yes/No
NOTES: (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

Took 45 minutes to fill/label bottles

SAMPLER(S) SIGNATURE:

*[Signature]*



# GROUNDWATER SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelter Site	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 3/4/14
<b>WELL NO:</b> MW 13B	<b>SAMPLE ID:</b> SMS MW 13B	<b>SAMPLE TIME:</b> 1020
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b>		

## PURGING DATA

<b>Well Type:</b> PVC	<b>Pump: (S/N):</b> Pine 02616 GeoSub	<b>Total Well Depth (feet):</b> 71
<b>Well Diameter (inches):</b> 2	<b>Water Quality Meter: (S/N):</b> Pine 011871 YSI 556 MP5	<b>Screen Interval (feet):</b> 56-71
<b>Tubing Diameter (inches):</b> 3/16 ID x 0.250 OD	<b>Turbidity Meter: (S/N):</b> Pine 21541 HACH 2100Q	<b>Static Depth to Water (feet):</b> 23.45 bbl
<b>Tubing Material:</b> PTFE (Teflon) ✓	<b>Water Level Indicator: (S/N):</b> Pine 1969 Solinst	<b>Tubing Depth (Begin/End):</b> ~ 66 → 63

**1 WELL VOLUME PURGE** = (Total Well Depth - Static Depth to Water) X Well Capacity  
= (        feet        -        feet        ) X        gallons/foot        =        gallons

**Volume to be Purged (gallons):**

**Total Volume Purged (gallons):**

**Purge Method:** Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
0832	0.5	0.5	23.72	14.46	0.614	3.2	7.10	-22.9	185	slight gray
0838	0.5	1.0	23.71	14.78	0.607	1.5	7.11	0.6	127	muddy
0846	0.5	1.5	23.71	14.80	0.606	0.8	7.12	19.4	83.6	muddy
0853	0.5	2.0	23.71	14.92	0.608	0.0	7.12	39.2	84.1	oilty
0900	0.5	2.5	23.71	14.97	0.610	0.0	7.11	80.9	86.4	silty
0907	0.5	3.0	23.71	15.08	0.612	0.0	7.11	82.2	79.4	clearing *
0914	0.5	3.5	23.70	14.57	0.590	0.2	7.12	81.3	297	turbid
0921	0.5	4.0	23.69	14.58	0.590	0.6	7.12	69.4	131	silty
0929	0.5	4.5	23.70	14.85	0.599	0.0	7.12	73.1	52.8	clearing
0936	0.5	5.0	23.70	14.83	0.602	0.0	7.11	75.6	40.0	clearing
0943	0.5	5.5	23.70	14.84	0.605	0.0	7.10	78.0	23.8	clearing
0950	0.5	6.0	23.69	14.85	0.609	0.0	7.10	79.8	17.7	clear
0958	0.5	6.5	23.69	14.78	0.613	0.0	7.09	82.3	14.4	clear

**Well Capacity (Gal/Ft):** 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
**Stabilization Criteria Range:** Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation; pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

<b>Field Filtered:</b> Yes (No) <input checked="" type="checkbox"/>	<b>Filter Size:</b> _____	<b>Duplicate:</b> Yes (No) <input checked="" type="checkbox"/>	<b>Duplicate ID:</b> _____	<b>Time:</b> _____	<b>MS/MSD:</b> Yes (No) <input checked="" type="checkbox"/>
---	---------------------------	--	----------------------------	--------------------	---

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

\* Moved pump intake up about 3 feet to try to get turbidity to decrease. Reading @ 0914 went up.

1005 0.5 7.0 23.70 14.93 0.619 0.0 7.09 81.3 10.2

**SAMPLER(S) SIGNATURE:**

*[Signature]*





MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS

# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 3/4/14
WELL NO: MW 13A	SAMPLE ID: SMS MW 13A	SAMPLE TIME: 1255
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type: <b>PVC</b>	Pump: (S/N): <b>Pine 02616 GeoSub</b>	Total Well Depth (feet): <b>30</b>
Well Diameter (inches): <b>2</b>	Water Quality Meter: (S/N): <b>Pine 011871 YSI 556 MPS</b>	Screen Interval (feet) <b>20-30</b>
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b> ✓	Turbidity Meter: (S/N): <b>Pine 21541 HACH 2100Q</b>	Static Depth to Water (feet) <b>22.86</b>
Tubing Material: <b>PTFE (Teflon)</b> ✓	Water Level Indicator: (S/N): <b>Pine 1969 Solinst</b>	Tubing Depth (Begin/End) <b>25'</b>

$$\text{1 WELL VOLUME PURGE} = (\text{Total Well Depth} - \text{Static Depth to Water}) \times \text{Well Capacity}$$

$$= (\text{feet} - \text{feet}) \times \text{gallons/foot} =$$

Volume to be Purged (gallons):

Total Volume Purged (gallons):

**Purge Method:** Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")

[illegible]

**Well Capacity (Gal/Ft):** 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88

**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

**Stabilization Criteria Range:** Specific Conductance:  $\pm 5\%$ ; Dissolved Oxygen:  $\pm 0.2$  mg/L or 10% saturation, pH:  $\pm 0.1$  unit; Turbidity:  $<10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No	Filter Size: _____	Duplicate: Yes/No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

→ Hex Cr

**SAMPLER(S) SIGNATURE:**



## GROUNDWATER SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelter Site	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 3-5-14
<b>WELL NO:</b> MW3B	<b>SAMPLE ID:</b> SMS MW3B	<b>SAMPLE TIME:</b> 1045
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b>		

### PURGING DATA

Well Type: <b>PVC</b>	Pump: (S/N): <b>Pine 02616 Geo Sub</b>	Total Well Depth (feet): <b>66</b>
Well Diameter (inches): <b>2</b>	Water Quality Meter: (S/N): <b>Pine 011871 YSI 556 MPS</b>	Screen Interval (feet): <b>56-66</b>
Tubing Diameter (inches): <b>3/16ID x 0.250D</b>	Turbidity Meter: (S/N): <b>Pine 21541 HACH 2100Q</b>	Static Depth to Water (feet): <b>32.78</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>Pine 1969 Solinst</b>	Tubing Depth (Begin/End): <b>~60</b>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet        ) X        gallons/foot        =        gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (ms/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
0853	0.25	0.25	33.85	14.35	115.9	0.85	5.47	60.8	OVERNG	Ø/silty
0919	0.50	0.75	34.15	14.73	115.5	0.37	5.48	66.0	26.8	"
0927	0.25	1.00	34.55	15.84	114.8	0.34	5.49	30.6	144	"
0937	0.25	1.25	34.91	15.39	114.5	0.39	5.49	51.1	114	"
0949	0.50	1.75	35.85	17.15	113.2	0.32	5.50	71.8	72.8	"
1002	0.50	2.25	36.25	16.93	112.8	0.27	5.51	48.8	53.5	"
1010	0.50	2.75	36.28	16.86	112.6	0.28	5.51	36.2	31.2	Ø/clear
1020	0.50	3.25	36.35	16.84	113.2	0.25	5.51	35.8	22.6(30)	18.5
1032	0.25	3.50	36.30	16.92	112.9	0.24	5.52	59.3	11.1	Ø/clear
1040	0.25	3.75	36.30	16.93	112.9	0.24	5.51	64.4	10.1	Ø/clear

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/ <b>No</b>	Filter Size: _____	Duplicate: Yes/ <b>No</b>	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ <b>No</b>
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**

J. Waller



# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 3/5/14
WELL NO: MWO1A	SAMPLE ID: SMSMWO1A	SAMPLE TIME: 1435
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type: PVC	Pump: (S/N): Pine 02616 GeoSub	Total Well Depth (feet): 40
Well Diameter (inches): 2	Water Quality Meter: (S/N): Pine 011871 YSI 556	Screen Interval (feet): 30-40
Tubing Diameter (inches): 3/16ID x 0.250D ✓	Turbidity Meter: (S/N): Pine 21541 HACH	Static Depth to Water (feet): 28.40
Tubing Material: PTFE (Teflon) ✓	Water Level Indicator: (S/N): Pine 1969 Solinst	Tubing Depth (Begin/End): 135

1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet ) X        gallons/foot        =        gallons	Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")	Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (µS/cm at 25°C)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1325	0.75	0.75	28.9	17.57	27.79	4.10	6.62	105.7	141	φ/silth
1331	0.50	1.25	29.05	17.51	29.18	2.32	6.59	123.3	109	"
1337	0.50	1.75	29.08	17.56	29.90	1.90	6.56	126.8	85.1	"
1345	0.75	2.50	29.18	17.58	30.39	1.58	6.55	126.6	46.7	"
1349	0.75	2.75	29.20	17.57	30.48	1.49	6.54	120.5	32.1	"
1354	0.50	3.25	29.21	17.56	30.64	1.34	6.53	118.5	25.2	"
1357	0.25	3.50	29.23	17.58	30.82	1.24	6.53	113.8	19.0	"
1402	0.25	3.75	29.25	17.61	30.91	1.17	6.52	96.5	14.9	clear
1404	0.25	4.00	29.28	17.64	31.70	1.05	6.51	88.4	12.4	clear
1411	0.25	4.50	29.29	17.64	31.83	1.05	6.51	88.8	10.6	clear
1414	0.25	4.75	29.29	17.64	32.01	1.00	6.51	87.6	9.34	clear

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes (No) Filter Size: _____	Duplicate: Yes (No) Duplicate ID: _____	Time: _____	MS/MSD: Yes (No)
NOTES: (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)			

SAMPLER(S) SIGNATURE:

*Shag*



**SMOKEY MOUNTAIN SMELTERS**  
Knoxville, Knox County, Tennessee

**March 2014**

**Quarterly Event 3**

**Remedial Investigation / Feasibility Study**

**Groundwater Sampling Log**

**Book 3 of 3**



**J.M.WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**



# CALIBRATION LOG

Site Name: Smokey Mtn. Smelters

Date	Parameter	Initial Reading	Calibration Response	Verification Response	Time	End of Day Check	Time	Instrument Manufacturer	Serial Number	Calibration Standard Lot #/Expiration	Signature
02/03/14	D0% conduct.	114.5 1.595	97.2 1.413	✓ ✓	1308 1310	1.354 ↓	1534	YSI 386	020018 23105812	1050	
	pH 7.0	7.68	6.916	✓	1213	7.0	1524		220425		
	pH 4.0	3.92	4.00	✓	1320	4.12	1527		230425		
	ORP	244.7	240	✓	1325	255.2	1535		↓	→	
03/04/14	D0% cond.	84.7 1.378	94.7 1.413	✓ ✓	0745 0753	9.7 1.416	1652	YSI 386	011871		
	pH 7.0	6.76	6.916	✓	0800	7.11	1650		↓		
	pH 4.0	4.08	3.98	✓	0802	4.28	1652		↓		
	ORP	275	240	✓	0802	226.9	1654		↓		
03/05/14	D0% cond.	110% 1.291	99% 1.413	✓ ✓	0741 0743	81.9 1.321	1434 1437		↓		
	pH 7.0	7.00	6.98	✓	0746	7.13	1440		↓		
	pH 4.0	4.08	4.01	✓	0750	4.20	1442		↓		
	ORP	1.337	1.413	✓	0758	232.7	1447		↓		

Each instrument will be calibrated using calibration standards provided by the manufacturer or instrument vendor at the beginning of each work day, after battery replacement during each work day, after sensor maintenance during each work day, and after a failed calibration verification. Calibration consists of stabilization and electronic "spanning" of the instrument/sensor response to the calibration standard set via instrument software and manufacturer's instructions. Calibration verification consists of stabilization of the instrument/sensor with the calibration standard set to verify response within +/- 10% of the calibration standard set value. Calibration verification will be performed immediately following calibration, at the end of each instrument use period (ie before turning the instrument off), at initiation of instrument use after restarting (ie after turning the instrument on after a shutdown during the work day), at any time during the work period when instrument readings are suspect, and at any time directed by the FOL. Include the unit of measure, i.e. "mV", "S.U.", "NTU", etc. in the calibration value column. THE FOL WILL REVIEW THIS CALIBRATION LOG AND COMPLETE THE FORM WITH HIS/HER SIGNATURE AT THE END OF EACH WORK DAY.

FOL Name: \_\_\_\_\_

FOL Signature: \_\_\_\_\_



## GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>03/03/2014</b>
WELL NO: <b>10A</b>	SAMPLE ID: <b>SMO-MW-10A</b>	SAMPLE TIME: <b>1430</b>
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: <b>Windy, snowing, Cold</b>		

### PURGING DATA

Well Type: <b>Flush</b>	Pump: (S/N): <b>Peristaltic # 902204</b>	Total Well Depth (feet): <b>32</b>
Well Diameter (inches): <b>2</b>	Water Quality Meter: (S/N): <b>YSI 550 #C000608</b>	Screen Interval (feet): <b>22-32</b>
Tubing Diameter (inches): <b>3/16 ID x 0.25 OD</b>	Turbidity Meter: (S/N): <b>HACH 2100Q C020134</b>	Static Depth to Water (feet): <b>17.00</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>Solinst # 010489</b>	Tubing Depth (Begin/End): <b>17.00</b>

<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet        -        feet ) X        gallons/foot        =        gallons	Volume to be Purged (gallons):  Total Volume Purged (gallons):
---	--

**Purge Method:** Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1339	—	.25	18.65	14.11	4.350	4.35	14.04	431.0	10.84	clear
1345	.25	.50	19.01	13.27	4.272	3.44	3.80	422.0	7.00	clear
1350	.25	.75	19.30	13.22	4.414	4.00	4.00	436.3	5.48	clear
1356	.25	1.00	19.50	12.55	4.594	3.91	3.93	439.2	5.03	clear
1403	.25	1.25	19.62	12.28	4.693	4.28	3.90	410.9	3.80	clear
1409	.25	1.50	19.94	13.14	4.168	3.24	3.55	413.0	3.65	clear
1419	.25	1.75	19.99	12.20	5.289	3.26	3.71	420.5	2.29	clear
1427	.25	2.00	19.97	12.10	5.343	3.28	3.76	411.7	1.95	clear

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.68  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0008; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: <b>SMO-MW-10A</b>	Time: <b>1434</b>	MS/MSD: Yes/ No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

SAMPLER(S) SIGNATURE: \_\_\_\_\_





MANAGING THE VISION® ENVIRONMENTAL | FACILITIES | LOGISTICS

# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 03/02/2014
WELL NO: SMSMW103	SAMPLE ID: SMSMW117	SAMPLE TIME: 0922
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: Cold, cloudy, Freezing		
PURGING DATA		

## PURGING DATA

Well Type: <b>Flush</b>	Pump: (S/N):	Total Well Depth (feet): <b>30</b>
Well Diameter (inches):	Water Quality Meter: (S/N): <i>Same as written on page 7</i>	Screen Interval (feet): <b>15-30</b>
Tubing Diameter (inches): <b>2</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet): <b>11.35</b>
<b>3/16ID x 0.25OD</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End)
Tubing Material: <b>PTFE (Teflon)</b>		

$$\text{1 WELL VOLUME PURGE} = (\text{Total Well Depth} - \text{Static Depth to Water}) \times \text{Well Capacity}$$

$$= (\text{feet} - \text{feet}) \times \text{gallons/foot} = \text{gallons}$$

Volume to be Purged (gallons):

**Total Volume Purged (gallons):**

**Purge Method:** Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")

[illegible]

Well Capacity (Gal/FT): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/FT): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: + 5%; Dissolved Oxygen: + 0.2 mg/L or 10% saturation, pH: + 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No Filter Size: Duplicate: Yes/No Duplicate IDs: Yes/No Time: MS/MSD: Yes/No  
**NOTES:** (Sample Analysis, Field Screening Analysis, Photographic Information, Rational for Sample Method Used, Well Observations/Conditions)

**NOTES:** (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)

**SAMPLER(S) SIGNATURE:**





# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 03/04/2014
WELL NO: SM5HW11B	SAMPLE ID: SM5MW11B	SAMPLE TIME: 1635
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: cold clouds		

## PURGING DATA

Well Type:	Pump: (S/N):	Same as written on page 1	Total Well Depth (feet): 56
Well Diameter (inches):	Water Quality Meter: (S/N):		Screen Interval (feet): 41-56
Tubing Diameter (inches): 3/16ID x 0.25OD	Turbidity Meter: (S/N):		Static Depth to Water (feet)
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N):		Tubing Depth (Begin/End)
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (                      feet                      ) X                      gallons/foot                      =                      gallons			Volume to be Purged (gallons):  Total Volume Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Slipping from the Top") or Low-Flow ("Tubing in Mid Screen")			

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\leq 1$  unit; Turbidity:  $<10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: <u>Yes</u> /No	Filter Size: <u>5µm</u>	Duplicate: Yes/ <u>No</u>	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ <u>No</u>
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**



# GROUNDWATER SAMPLING LOG

SITE NAME: <b>Smokey Mountain Smelter Site</b>	SITE LOCATION: <b>Knoxville, Tennessee</b>	DATE: <b>03/04/14</b>
WELL NO: <b>01B3M012B</b>	SAMPLE ID: <b>SMSM012B</b>	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: <b>cloudy, cool</b>		

## PURGING DATA

Well Type: <b>Flush</b>	Pump: (S/N): <b>Submersible #020015</b>	Total Well Depth (feet): <b>62</b>
Well Diameter (inches): <b>2</b>	Water Quality Meter: (S/N): <b>Same as on page 1</b>	Screen Interval (feet): <b>52-62</b>
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N): <b>Same as on page 1</b>	Static Depth to Water (feet): <b>52-62</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>Same as on page 1</b>	Tubing Depth (Begin/End):
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = ( <b>62</b> feet - <b>52</b> feet ) X <b>115.75</b> gallons/foot = <b>1157.5</b> gallons		Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

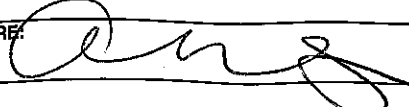
Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance µS/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1301	—	.25	29.12	15.16	4.701	.71	6.71	91.7	117	clear
1317	1.25	1.50	29.13	15.52	4.608	.84	6.86	95.6	580	clear
1323	.50	2.00	29.13	15.54	4.517	.38	6.85	96.8	369	clear
1330	.50	2.50	29.13	16.00	4.395	.30	6.50	89.0	331	clear
1338	.50	3.00	29.13	16.05	4.273	.28	6.58	83.7	294	clear
1346	.50	3.50	29.13	16.05	4.128	.25	6.87	78.0	266	clear
1354	.50	4.00	29.14	16.08	3.825	.22	6.56	73.6	224	clear
1403	.50	4.50	29.14	16.06	3.599	.19	6.57	71.4	214	clear
1408	.50	5.00	29.14	16.05	3.416	.19	6.57	70.2	190	clear
1415	.50	5.50	29.14	16.09	3.279	.19	6.57	65.8	178	clear
1425	.50	6.00	29.14	16.04	3.114	.19	6.57	62.3	174	clear
1432	.50	6.50	29.14	16.04	3.087	.19	6.57	61.9	144	clear
1440	.50	7.00	29.14	16.11	2.980	.20	6.57	59.4	163	clear

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No <b>Yes</b>	Filter Size: <b>5µm</b>	Duplicate: Yes/No <b>No</b>	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No <b>No</b>
NOTES: (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

Continued on page 5

SAMPLER(S) SIGNATURE: 





# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 8/04/14
WELL NO: SMSM02B	SAMPLE ID: SMSM02B	SAMPLE TIME: 1347
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type: <b>Flow</b>	Pump: (S/N):	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter: (S/N): <b>same as page 7</b>	Screen Interval (feet)
Tubing Diameter (inches): <b>2</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet)
<b>3/16ID x 0.25OD</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End)
Tubing Material: <b>PTFE (Teflon)</b>		
<b>1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity</b> = (                feet       -                feet ) X                gallons/foot       =                gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\leq 1$  unit; Turbidity:  $<10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No	Filter Size: _____	Duplicate: Yes/No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.) * Approval from LP to Sample with high turbidity					

**SAMPLER(S) SIGNATURE:**





# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 03/05/2014
WELL NO: MW08	SAMPLE ID: SMSMW08R	SAMPLE TIME: 0940
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: Sunny, cool, frost on ground		
PURGING DATA		

## PURGING DATA

Well Type: <i>Flush</i> Well Diameter (inches): <i>2</i> Tubing Diameter (inches): <b>3/16ID x 0.25OD</b> Tubing Material: <b>PTFE (Teflon)</b>	Pump: (S/N): Water Quality Meter: (S/N): Turbidity Meter: (S/N): Water Level Indicator: (S/N):	Total Well Depth (feet): <i>35</i> Screen Interval (feet): <i>25-35</i> Static Depth to Water (feet): Tubing Depth (Begin/End):
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                      feet –                      feet) X                      gallons/foot =                      gallons		Volume to be Purged (gallons): Total Volume Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		

[illegible]

**Well Capacity (Gal/Ft):** 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0005; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
**Stabilization Criteria Range:** Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\geq 0.1$  unit; Turbidity:  $< 10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No	Filter Size: _____	Duplicate: Yes/No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**









# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 03/05/14
WELL NO: SMSM004A	SAMPLE ID: SMSM004A	SAMPLE TIME: 1344
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: Sunny, breezy, warm		

## PURGING DATA

Well Type: <i>Flush</i> Well Diameter (inches): <i>2</i> Tubing Diameter (inches): <b>3/16ID x 0.25OD</b> Tubing Material: <b>PTFE (Teflon)</b>	Pump: (S/N): Water Quality Meter: (S/N): Turbidity Meter: (S/N): Water Level Indicator: (S/N):	Total Well Depth (feet): <i>37</i> Screen Interval (feet): <i>25-35</i> Static Depth to Water (feet): Tubing Depth (Begin/End):
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (                      feet -                      feet) X                      gallons/foot =                      gallons		Volume to be Purged (gallons): Total Volume Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.66; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\pm 0.1$  unit; Turbidity:  $\leq 10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No	Filter Size: _____	Duplicate: Yes/No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No
<b>NOTES:</b> (Sample Analysis, Field Screening Analysis, Photograph Information, Rational for Sample Method Used, Well Observations/ Conditions.)					

**SAMPLER(S) SIGNATURE:**



**SMOKEY MOUNTAIN SMELTERS**  
Knoxville, Knox County, Tennessee

**March 2014**

**Quarterly Event 3**

**Remedial Investigation / Feasibility Study**

**Surface Water Sampling Log**

**Book 1 of 1**



**J.M. WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**





MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS

**Site Name:**

[illegible]

Each instrument will be calibrated using calibration standards provided by the manufacturer or instrument vendor at the beginning of each work day, after battery replacement during each work day, after sensor maintenance during each work day, and after a failed calibration verification. Calibration consists of stabilization and electronic "spanning" of the instrument/sensor response to the calibration standard set via instrument software and manufacturer's instructions. Calibration verification consists of stabilization of the instrument/sensor with the calibration standard set to verify response within +/- 10% of the calibration standard set value. Calibration verification will be performed immediately following calibration, at the end of each instrument use period (ie before turning the instrument off), at initiation of instrument use after restarting (ie after turning the instrument on after a shutdown during the work day), at any time during the work period when instrument readings are suspect, and at any time directed by the FOL. Include the unit of measure, i.e. "mV", "S.U.", "NTU", etc. in the calibration value column. **THE FOL WILL REVIEW THIS CALIBRATION LOG AND COMPLETE THE FORM WITH HIS/HER SIGNATURE AT THE END OF EACH WORK DAY.**

FOL Name: \_\_\_\_\_

**FOL Signature:**





## SURFACE WATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee				DATE: 3/3/14	
SAMPLE ID: SMSSW01						SAMPLE TIME: 11:17	
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
1117	7.02	0.123	107.7	5.94	66.3		Range : Result:
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No	
SAMPLER(S) SIGNATURE: HGC							

Notes:

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee				DATE: 3/3/14	
SAMPLE ID: SMSSW11						SAMPLE TIME: 13:20	
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
1320	7.68	0.239	90.1	6.60	35.5		Range : Result:
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No	
SAMPLER(S) SIGNATURE: HGC							

Notes: MS/MSD

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee				DATE: 3/3/14	
SAMPLE ID: SMSSW14						SAMPLE TIME: 14:15	
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
	7.78	0.410	88.5	6.80 8.3	19.4		Range : Result:
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No	
SAMPLER(S) SIGNATURE: HGC							

Notes:



## SURFACE WATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelters				SITE LOCATION: Knoxville, Tennessee				DATE: 3/3/14	
SAMPLE ID: SMSSW 13								SAMPLE TIME: 14:50	

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)			Fe (capsule)
14:50	7.76	0.487	83.6	7.30	7.5				Range : Result:
Stream Flow rate:		Stream width:		Stream depth:					
Field Filtered: Yes/ No		Filter Size: _____	Duplicate: Yes/ No		Duplicate ID: _____	Time:	MS/MSD: Yes/ No		
SAMPLER(S) SIGNATURE: _____									

Notes: HGC

SITE NAME: Smokey Mountain Smelters				SITE LOCATION: Knoxville, Tennessee				DATE: 3/3/14	
SAMPLE ID: SMSSW 09								SAMPLE TIME: 16:10	

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)			Fe (capsule)
14:10	7.28	0.594	84.0	7.09	-10.7				Range : Result:
Stream Flow rate:		Stream width:		Stream depth:					
Field Filtered: Yes/ No		Filter Size: _____	Duplicate: Yes/ No		Duplicate ID: _____	Time:	MS/MSD: Yes/ No		
SAMPLER(S) SIGNATURE: _____									

Notes: HGC

SITE NAME: Smokey Mountain Smelters				SITE LOCATION: Knoxville, Tennessee				DATE: 3/3/14	
SAMPLE ID: SMSSW 09 Spring								SAMPLE TIME: 15:45	

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)			Fe (capsule)
15:45	12.91	0.579	58.5	7.03	-9.5				Range : Result:
Stream Flow rate:		Stream width:		Stream depth:					
Field Filtered: Yes/ No		Filter Size: _____	Duplicate: Yes/ No		Duplicate ID: _____	Time:	MS/MSD: Yes/ No		
SAMPLER(S) SIGNATURE: _____									

Notes: HGC





## SURFACE WATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee				DATE: 3/4/14	
SAMPLE ID: SM55W20						SAMPLE TIME: 9:47	
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Ferrous Iron (Field Test)
9:47	4.75	0.295	77.1	8.26	-45.9		Range :
							Result:
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No	

SAMPLER(S) SIGNATURE: *H6C*

Notes: middle of small lake, parallel w dock

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee				DATE: 3/4/14	
SAMPLE ID: SM55W05						SAMPLE TIME:	
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
							Range :
							Result:
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No	

SAMPLER(S) SIGNATURE:

Notes: lake level too low to reach sample area

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee				DATE: 3/4/14	
SAMPLE ID: SM55W10						SAMPLE TIME: 9:16	
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
9:16	4.84	0.284	78.4	8.28	-41.2		Range :
							Result:
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No	

SAMPLER(S) SIGNATURE: *H6C*

Notes: low water, sample taken half way up cave water 9" deep, murky-clear



# **SURFACE WATER SAMPLING LOG**

<b>SITE NAME:</b> Smokey Mountain Smelters				<b>SITE LOCATION:</b> Knoxville, Tennessee			<b>DATE:</b> 3/4/14	
<b>SAMPLE ID:</b> SMSSW02							<b>SAMPLE TIME:</b> 12:54	
<b>Time</b>	<b>Temp. (°C)</b>	<b>Specific Conductance ms/cm or µS/cm</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>pH (standard units)</b>	<b>ORP (mV)</b>	<b>Turbidity (NTU)</b>	<b>Ferrous Iron (Field Test)</b>	
12:54	7.06	1.120	92.5	7.98	20.5	15.6	Range :	
							Result:	
Stream Flow rate:			Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No		Duplicate ID:	Time:	MS/MSD: Yes/ No	
<b>SAMPLER(S) SIGNATURE:</b> HGC								

Notes: algae in water at this location

<b>SITE NAME:</b> Smokey Mountain Smelters				<b>SITE LOCATION:</b> Knoxville, Tennessee			<b>DATE:</b> 3/4/14	
<b>SAMPLE ID:</b> SMSSW08							<b>SAMPLE TIME:</b> 13:50	
<b>Time</b>	<b>Temp. (°C)</b>	<b>Specific Conductance ms/cm or µS/cm</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>pH (standard units)</b>	<b>ORP (mV)</b>	<b>Turbidity (NTU)</b>	<b>Fe (capsule)</b>	
13:50	7.72	20.867	58.3	8.05	-18.1	10.6	Range :	
							Result:	
Stream Flow rate:			Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No		Duplicate ID:	Time:	MS/MSD: Yes/ No	
<b>SAMPLER(S) SIGNATURE:</b> HGC								

Notes: above spring

<b>SITE NAME:</b> Smokey Mountain Smelters				<b>SITE LOCATION:</b> Knoxville, Tennessee			<b>DATE:</b> 3/4/14	
<b>SAMPLE ID:</b> SMSSW08 Spring							<b>SAMPLE TIME:</b> 13:38	
<b>Time</b>	<b>Temp. (°C)</b>	<b>Specific Conductance ms/cm or µS/cm</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>pH (standard units)</b>	<b>ORP (mV)</b>	<b>Turbidity (NTU)</b>	<b>Fe (capsule)</b>	
13:38	12.81	1.768	32.4	8.09	-25.8	8.12	Range :	
							Result:	
Stream Flow rate:			Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No		Duplicate ID:	Time:	MS/MSD: Yes/ No	
<b>SAMPLER(S) SIGNATURE:</b> HGC								

Notes: Spring



# **SURFACE WATER SAMPLING LOG**

<b>SITE NAME:</b> Smokey Mountain Smelters		<b>SITE LOCATION:</b> Knoxville, Tennessee		<b>DATE:</b> 3/4/14	
<b>SAMPLE ID:</b> SMSSW04		SMSSW94 (Dup)		<b>SAMPLE TIME:</b> 14:40	

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Flow Rate	Ferrous Iron (Field Test)
	5.66	0.793	58.4	7.81	26.1	19.7		Range : Result:

Stream Flow rate: Stream width: Stream depth:

Field Filtered: Yes/ No Filter Size: Duplicate: ☒ Yes/ No Duplicate ID: 94 Time: 14:51 MS/MSD: Yes/ No

**SAMPLER(S) SIGNATURE:**  
HAC

Notes:

<b>SITE NAME:</b> Smokey Mountain Smelters		<b>SITE LOCATION:</b> Knoxville, Tennessee		<b>DATE:</b> 3/4/14	
<b>SAMPLE ID:</b> SMSSW12				<b>SAMPLE TIME:</b> 15:30	

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
15:30	5.72	0.686	55.3	7.75	25.5	11.4	Range : Result:

Stream Flow rate: Stream width: Stream depth:

Field Filtered: Yes/ No Filter Size: Duplicate: Yes/ No Duplicate ID: Time: MS/MSD: Yes/ No

**SAMPLER(S) SIGNATURE:**  
HAC

Notes:

<b>SITE NAME:</b> Smokey Mountain Smelters		<b>SITE LOCATION:</b> Knoxville, Tennessee		<b>DATE:</b> 3/5/14	
<b>SAMPLE ID:</b> SMSSW03				<b>SAMPLE TIME:</b> 13:45	

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
13:45	8.42	1.893	62.6	7.00	-10.8	39.5	Range : Result:

Stream Flow rate: Stream width: Stream depth:

Field Filtered: Yes/ No Filter Size: Duplicate: Yes/ No Duplicate ID: Time: MS/MSD: Yes/ No

**SAMPLER(S) SIGNATURE:**  
HAC

Notes:



## SURFACE WATER SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelters				<b>SITE LOCATION:</b> Knoxville, Tennessee				<b>DATE:</b>	
<b>SAMPLE ID:</b>								<b>SAMPLE TIME:</b>	
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Flow Rate	Ferrous Iron (Field Test)	
								Range :	
								Result:	
Stream Flow rate:			Stream width:		Stream depth:				
Field Filtered: Yes/ No		Filter Size: ____	Duplicate: Yes/ No		Duplicate ID: ____	Time:		MS/MSD: Yes/ No	
<b>SAMPLER(S) SIGNATURE:</b>									

Notes:

<b>SITE NAME:</b> Smokey Mountain Smelters				<b>SITE LOCATION:</b> Knoxville, Tennessee				<b>DATE:</b>	
<b>SAMPLE ID:</b>								<b>SAMPLE TIME:</b>	
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)			Fe (capsule)
									Range :
									Result:
Stream Flow rate:			Stream width:		Stream depth:				
Field Filtered: Yes/ No		Filter Size: ____	Duplicate: Yes/ No		Duplicate ID: ____	Time:		MS/MSD: Yes/ No	
<b>SAMPLER(S) SIGNATURE:</b>									

Notes:

<b>SITE NAME:</b>				<b>SITE LOCATION:</b> Knoxville, Tennessee				<b>DATE:</b>	
<b>SAMPLE ID:</b>								<b>SAMPLE TIME:</b>	
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)			Fe (capsule)
									Range :
									Result:
Stream Flow rate:			Stream width:		Stream depth:				
Field Filtered: Yes/ No		Filter Size: ____	Duplicate: Yes/ No		Duplicate ID: ____	Time:		MS/MSD: Yes/ No	
<b>SAMPLER(S) SIGNATURE:</b>									

Notes:



**SMOKEY MOUNTAIN SMELTERS**  
Knoxville, Knox County, Tennessee

**June 2014**

**Quarterly Event 4**

**Remedial Investigation / Feasibility Study**

**Groundwater Sampling Log**

**Book 1 of 3**



**J.M. WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**





MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS

## INSTRUMENT AND CALIBRATION LOG

**Site Name:**

Date	Parameter	Calibration Value	Time	Verification Response	Time	Signature	Instrument Type and Manufacturer	Serial Number	Calibration Standard Lot
0/0/0	example ORP cal and verification	240 mV	803	238.7	813	Signature	Example/Example	Pine 010111	N6L77-8
0/0/0	example pH 7 verification	-	-	6.98	1752	Signature	Example/Example	Pine 010111	M6A84-2
6-23	ORP	240	8:30	242	8:00	ST	YSLOSH1951	127347	
	COND	1.413	8:31	1.40	8:05	ST			
	pH 4	4.0	8:32	4.17	8:10	ST			
	pH 7	7.0	8:35	7.15	8:12	ST			
	pH 10	10	8:37	9.95	8:15	ST			
	DO		8:45	87.7%	7:44 8:26	ST			
	ORP	240	4:01	241	1520	ST			
	COND	1.413	4:03	1.39	1520	ST			
	pH 4	4	4:04	4.1	1522	ST			
	pH 7	7	4:07	7.2	1525	ST			
	pH 10	10	4:10	9.99	1528	ST			
	DO		4:30						
6-24	ORP	240	1240	2.42	1:30	ST			
	COND	1.413	1242	1.40	1:32				
	pH 4	4.0	1245	4.6	1:29				
	pH 7	7.0	1246	7.14	1:27				
	pH 10	10.0	1248	9.90	1:25				
	DO		1250		1:38				

Each instrument will be calibrated using calibration standards provided by the manufacturer or instrument vendor at the beginning of each work day, after battery replacement during each work day, after sensor maintenance during each work day, and after a failed calibration verification. Calibration consists of stabilization and electronic "spanning" of the instrument/sensor response to the calibration standard set via instrument software and manufacturer's instructions. Calibration verification consists of stabilization of the instrument/sensor with the calibration standard set to verify response within +/- 10% of the calibration standard set value. Calibration verification will be performed immediately following calibration, at the end of each instrument use period (ie before turning the instrument off), at initiation of instrument use after restarting (ie after turning the instrument on after a shutdown during the work day), at any time during the work period when instrument readings are suspect, and at any time directed by the FOL. Include the unit of measure, i.e. "mV", "S.U.", "NTU", etc. in the calibration value column. THE FOL WILL REVIEW THIS CALIBRATION LOG AND COMPLETE THE FORM WITH HIS/HER SIGNATURE AT THE END OF EACH WORK DAY.

FOL Name: \_\_\_\_\_

FOL Signature: \_\_\_\_\_



# INSTRUMENT AND CALIBRATION LOG

Site Name:

Date	Parameter	Calibration Value	Time	Verification Response	Time	Signature	Instrument Type and Manufacturer	Serial Number	Calibration Standard Lot
0/0/0	example ORP cal and verification	240 mV	803	238.7	813	Signature	Example/Example	Pine 010111	N6L77-8
0/0/0	example pH 7 verification	-	-	6.98	1752	Signature	Example/Example	Pine 010111	M6A84-2
6-24	ORP	240	3:00						
	COND	1.443	3:01						
	pH4	4.0	2:02						
	pH7	7.0	3:05						
	pH10	10.0	3:10						
	DO	89.3	3:13						
6/25	DO	89.3	0815	160.0	0815	Qunt	YSI 550 MPS	PINE 010111	10203
	COND	1.420	0815	1.413	0818	↓	↓	↓	2300850
	pH7	7.01	0815	7.00	0820	↓	↓	↓	1.041
	pH4	4.02	0815	4.00	0830	↓	↓	↓	2.09
	ORP	229.5	0820	240	0830	↓	↓	↓	4.0
									5245
									5443

Each instrument will be calibrated using calibration standards provided by the manufacturer or instrument vendor at the beginning of each work day, after battery replacement during each work day, after sensor maintenance during each work day, and after a failed calibration verification. Calibration consists of stabilization and electronic "spanning" of the instrument/sensor response to the calibration standard set via instrument software and manufacturer's instructions. Calibration verification consists of stabilization of the instrument/sensor with the calibration standard set to verify response within +/- 10% of the calibration standard set value. Calibration verification will be performed immediately following calibration, at the end of each instrument use period (ie before turning the instrument off), at initiation of instrument use after restarting (ie after turning the instrument on after a shutdown during the work day), at any time during the work period when instrument readings are suspect, and at any time directed by the FOL. Include the unit of measure, i.e. "mV", "S.U.", "NTU", etc. in the calibration value column. THE FOL WILL REVIEW THIS CALIBRATION LOG AND COMPLETE THE FORM WITH HIS/HER SIGNATURE AT THE END OF EACH WORK DAY.

FOL Name:

FOL Signature:





SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 6-23
WELL NO: 7-A	SAMPLE ID:	SAMPLE TIME: 10:30
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

Well Type:	Pump: (S/N): 024611	Total Well Depth (feet):
Well Diameter (inches): 2	Water Quality Meter: (S/N): R7341	Screen Interval (feet)
Tubing Diameter (inches): 3/16ID x 0.25OD	Turbidity Meter: (S/N): 18981	Static Depth to Water (feet): 18.9
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N): 12828	Tubing Depth (Begin/End): 20.5
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                    feet                    –                    feet ) X                    gallons/foot                    =                    gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0028; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilizing Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\leq 1$  unit; Turbidity:  $<10$  NTU

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
<b>PHOTO LOG:</b> (Photo number, time/date, direction photo is facing, description of photographed subject)					
<b>General Notes:</b> (Well observations/ conditions, reason if deviation from SAP/ Protocol)					
PASSED purge to Recd D.O. 0942 : <i>Rate @ 97.3%</i> <i>Recovery purge @ 9:50</i> <i>Photo: 7A facing west</i> <i>Le/23 10:00</i>					
<b>Field Screening Results:</b> (Hach Ferrous Iron)					
0.0					

**SAMPLER(S) SIGNATURE:**

SIGNATURE: S Thompson





J.M. WALLER  
ASSOCIATES, INC.

MANAGING THE VISION | ENVIRONMENTAL | FACILITIES | LOGISTICS

## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 6-23-14
WELL NO: MW7B	SAMPLE ID:	SAMPLE TIME: 12:45
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Well Type:	Pump: (S/N): 024611	Total Well Depth (feet):
Well Diameter (inches): 2	Water Quality Meter: (S/N): R7431	Screen Interval (feet):
Tubing Diameter (inches): 3/16ID x 0.25OD	Turbidity Meter: (S/N): 110966012316 (PINE 18981)	Static Depth to Water (feet): 20.35
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N): 12828	Tubing Depth (Begin/End): 35
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet -        feet ) X        gallons/foot =        gallons		Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Slipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons): 2.0

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
1130	.125	.125	20.15	20.43	75.96	1.60	6.121	1718	56.2	
1135	.125	.25	20.15	20.67	76.48	.53	6.117	176	91.3	
1140	.125	.375	20.26	20.71	76.74	.44	6.14	181	9.5	
1145	.125	.50	20.30	20.83	76.96	.36	6.16	183	26.1	
1150	.125	.625	20.30	20.91	77.12	.33	6.16	184	20.3	
1155	.125	.75	20.30	20.98	79.01	.29	6.15	187	18.9	
1200	.125	.875	20.30	22.51	80.07	.24	6.117	191	14.4	
1205	.125	1.0	20.30	23.39	81.82	.29	6.118	193	8.56	
1210	.125	1.125	20.34	23.10	81.00	.31	6.118	196	7.26	
1215	.125	1.25	20.34	23.00	80.94	.38	6.119	199	6.76	
1220	.125	1.375	20.34	22.92	80.88	.31	6.118	199	4.15	
1225	.125	1.5	20.35	22.99	80.79	.26	6.118	199	4.22	
1230	.125	1.625	20.35	23.13	80.81	.25	6.119	199	4.58	
1235	.125	1.75	20.35	23.19	81.08	.26	6.118	198.5	6.5	
1240	.125	1.875	20.35	23.16	81.10	.25	6.119	198	6.0	
1245	.125	2.0	20.35	23.10	81.12	.24	6.119	198	7.0	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

### FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
PHOTO LOG: (Photo number, time/date, direction photo is facing, description of photographed subject)					
General Notes: (Well observations/ conditions, reason if deviation from SAP/ Protocol)					
Photo: 7B facing North @ 6/23 12:30					
Field Screening Results: (Hach Ferrous Iron)					
0.0					

SAMPLER(S) SIGNATURE: \_\_\_\_\_





# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 6.23.14
WELL NO: 11B	SAMPLE ID:	SAMPLE TIME: 1305
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		


## PURGING DATA

Well Type:	Pump: (S/N): 024611	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter: (S/N): <del>15498</del> 127431	Screen Interval (feet)
Tubing Diameter (inches): 3/16ID x 0.25OD	Turbidity Meter: (S/N): 18981	Static Depth to Water (feet) 9.45
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N): 12828	Tubing Depth (Begin/End)
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (            feet    –            feet ) X            gallons/foot    =            gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

**Well Capacity (Gal/Ft):** 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88 .  
**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.008; 1/2" = 0.010; 5/8" = 0.016  
**Stabilizing Criteria Range:** Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\leq 11$ ; Turbidity:  $\leq 10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: <input checked="" type="checkbox"/> Yes/ <input type="checkbox"/> No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
<b>PHOTO LOG:</b> (Photo number, time/date, direction photo is facing, description of photographed subject)					
<b>General Notes:</b> (Well observations/ conditions, reason if deviation from SAP/ Protocol)					
<b>Field Screening Results:</b> (Hach Ferrous Iron)					
6.0					
<b>SAMPLER(S) SIGNATURE:</b>					
					





## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 6.24
WELL NO: MW-11A	SAMPLE ID:	SAMPLE TIME: 2:55
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type:	Pump: (S/N): 024611	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter: (S/N): 1127431	Screen Interval (feet):
Tubing Diameter (inches): 3/16ID x 0.25OD	Turbidity Meter: (S/N): 18981	Static Depth to Water (feet): 8.01
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N): 12828	Tubing Depth (Begin/End): 2.0
1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity = (        feet -        feet ) X        gallons/foot =        gallons		Volume to be Purged (gallons):
Purge Method: Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (µS/cm or ms/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
140	1.25	1.25	8.01	17.07	8.28	.48	8.60	116.3	14.8	
145		1.25	8.01	17.16	8.292	.128	8.62	99	14.0	
150		1.375	8.01	17.54	8.456	.121	8.63	97	14.2	
155		1.500	8.01	18.21	8.550	.21	8.62	97	8.6	
200		1.675	8.01	18.22	8.641	.20	8.62	97.6	7.1	
205		1.750	8.01	18.23	8.679	.29	8.61	97.7	5.1	
210		1.875	8.01	18.23	8.660	.36	8.60	97.1	46.9	
215		1.00	8.01	18.24	8.661	.40	8.60	96.8	39.0	
220		1.125	8.01	18.67	8.808	.19	8.61	97.1	32.0	
225		1.250	8.01	18.00	8.821	.17	8.60	71.7	28.8	
230		1.375	8.01	19.00	8.861	.17	8.60	71.5	25.7	
235		1.50	8.01	19.18	8.975	.16	8.60	70.6	18.4	
240		1.675	8.01	19.61	9.000	.18	8.60	71.0	10.0	
245		1.750	8.01	19.66	9.001	.16	8.60	71.0	9.1	
250		1.875	8.01	19.65	9.000	.16	8.60	71.0	9.4	
255		2.0	8.01	19.65	8.990	.17	8.60	71.0	8.0	

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or 10% saturation, pH: ± 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size:	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No
PHOTO LOG: (Photo number, time/date, direction photo is facing, description of photographed subject)					
General Notes: (Well observations/ conditions, reason if deviation from SAP/ Protocol)					
Photo: 11A facing north 6/24 @ 1445					
Field Screening Results: (Hach Ferrous Iron)					

SAMPLER(S) SIGNATURE:



**SMOKEY MOUNTAIN SMELTERS**  
Knoxville, Knox County, Tennessee

**June 2014**

**Quarterly Event 4**  
**Remedial Investigation / Feasibility Study**

**Groundwater Sampling Log**  
**Book 2 of 3**



**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**





J.M. WALLER  
ASSOCIATES, INC.

MANAGING THE VISION | ENVIRONMENTAL | FACILITIES | LOGISTICS

## INSTRUMENT AND CALIBRATION LOG

Site Name:

Date	Parameter	Calibration Value	Time	Verification Response	Time	Signature	Instrument Type and Manufacturer	Serial Number	Calibration Standard Lot
0/0/0	example ORP cal and verification	240 mV	803	238.7	813	Signature	Example/Example	Pine 010111	N6L77-8
0/0/0	example pH 7 verification	-	-	6.98	1752	Signature	Example/Example	Pine 010111	M6A84-2
6/23/14	DO	97.2%	0739			AG	YSI 552 MPS	PINE 14825	
"	COND	1.413	0744	1.430	0822	AG			10704
"	pH 7	7.0	0753	6.96	0824	AG			2306880
"	pH 4	4.0	0815	3.96	0825	AG			2310A78
"	ORP	240.0	0819	240.0	0830	AG			5245
6/25/14	DO	95.5%	0805	100%	0808		YSI 552 MPS	PINE 04409	107034
	COND	1.340	0808	1.43	0812				23010580
	pH 7	7.05	0812	7.00	0815				2310A78
	pH 4	4.02	0815	4.00	0817				5245
	ORP	239.6	0817	240	0820				
	DO	96.1%	0819	100%	0821			PINE 07341	
	COND	1.254	0821	1.412	0823				
	pH 7	7.03	0823	7.00	0824				
	pH 4	4.02	0824	4.00	0826				
	ORP	235.3	0826	240	0828				

Each instrument will be calibrated using calibration standards provided by the manufacturer or instrument vendor at the beginning of each work day, after battery replacement during each work day, after sensor maintenance during each work day, and after a failed calibration verification. Calibration consists of stabilization and electronic "spanning" of the instrument/sensor response to the calibration standard set via instrument software and manufacturer's instructions. Calibration verification consists of stabilization of the instrument/sensor with the calibration standard set to verify response within +/- 10% of the calibration standard set value. Calibration verification will be performed immediately following calibration, at the end of each instrument use period (ie before turning the instrument off), at initiation of instrument use after restarting (ie after turning the instrument on after a shutdown during the work day), at any time during the work period when instrument readings are suspect, and at any time directed by the FOL. Include the unit of measure, i.e. "mV", "S.U.", "NTU", etc. in the calibration value column. THE FOL WILL REVIEW THIS CALIBRATION LOG AND COMPLETE THE FORM WITH HIS/HER SIGNATURE AT THE END OF EACH WORK DAY.

FOL Name: \_\_\_\_\_

FOL Signature: \_\_\_\_\_

3478





MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS

# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 6/23/14
WELL NO: SMS MW12A	SAMPLE ID: SMS MW12A	SAMPLE TIME: 1330
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type: PVC	Pump: (S/N): PINE 021017 GEO SUB.	Total Well Depth (feet): 34.10
Well Diameter (inches): 2"	Water Quality Meter: (S/N): YS1586 PINE # 17825	Screen Interval (feet): 25-40
Tubing Diameter (inches): 3/16ID x 0.25OD	Turbidity Meter: (S/N): HACH 2100R PINE # 20345	Static Depth to Water (feet): 37.0
Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N): SOLINIST PINE # 90417	Tubing Depth (Begin/End): ~39.0

$$\text{1 WELL VOLUME PURGE} = (\text{Total Well Depth} - \text{Static Depth to Water}) \times \text{Well Capacity}$$

$$= (\text{feet} - \text{feet}) \times \text{gallons/foot} = \text{gallons}$$

Volume to be Purged (gallons):

Total Volume Purged (gallons):

**Purge Method:** Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.85; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilizing Criteria Range: Specific Conductance: < 5%; Dissolved Oxygen: < 0.2 mg/L or 10% saturation, pH: < 1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

Field Filtered: <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	Filter Size: _____	Duplicate: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Duplicate ID: _____	Time: _____	MS/MSD: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
---	--------------------	--	---------------------	-------------	---

**PHOTO LOG:** (Photo number, time/date, direction photo is facing, description of photographed subject)

**General Notes:** (Well observations/ conditions, reason if deviation from SAP/ Protocol)

SLOW RECHARGE


Photos 2014-06-23 13.15.51

Facing ~~South~~ <sup>West</sup> W

**Field Screening Results: (Hach Ferrous Iron)**

3.04 mg/L

**SAMPLER(S) SIGNATURE:**

AMPLER(S) SIGNATURE: 





## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 6/23/14
WELL NO: SMSMW12B	SAMPLE ID: SMSMW12B	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type: <b>PVC</b>	Pump: (S/N):	Total Well Depth (feet): <b>61</b>
Well Diameter (inches): <b>2"</b>	Water Quality Meter: (S/N): <b>SAME AS PREVIOUS</b>	Screen Interval (feet): <b>46-61</b>
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet)
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End): <b>255</b>

$$\text{1 WELL VOLUME PURGE} = (\text{Total Well Depth} - \text{Static Depth to Water}) \times \text{Well Capacity}$$

$$= (\text{feet} - \text{feet}) \times \text{gallons/foot} = \text{gallons}$$

Volume to be Purged (gallons):

Total Volume Purged (gallons):

**Purge Method:** Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\geq 0.1$  unit; Turbidity:  $\leq 10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: <u>Yes</u> /No	Filter Size: _____	Duplicate: <u>Yes</u> /No	Duplicate ID: _____	Time: _____	MS/MSD: <u>Yes</u> /No
PHOTO LOG: (Photo number, time/date, direction photo is facing, description of photographed subject)					
General Notes: (Well observations/ conditions, reason if deviation from SAP/ Protocol)					
<p>TURBIDITY REMAINED HIGH DESPITE LONG SLOW PURES.</p> <p>PHOTO: <del>23</del> 2014-06-23 13.16</p>					
Field Screening Results: (Hach Ferrous Iron)					
3.28					

**SAMPLER(S) SIGNATURE:**









# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 6/25/14
WELL NO:	SAMPLE ID: MW13B	SAMPLE TIME: 1419
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		


## PURGING DATA

Well Type: <b>PVL</b>	Pump: (S/N): <b>SAME AS Previous</b>	Total Well Depth (feet): <b>72.85</b>
Well Diameter (inches): <b>2</b>	Water Quality Meter: (S/N):	Screen Interval (feet)
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet): <b>37.02</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End): <b>67</b>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth - Static Depth to Water) X Well Capacity = (                      feet -                      feet) X                      gallons/foot =                      gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or <u>Low-Flow</u> ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0008; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\leq 0.1$  unit; Turbidity:  $\leq 10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No <input checked="" type="checkbox"/> No	Filter Size: _____	Duplicate: Yes/No <input checked="" type="checkbox"/> No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No <input checked="" type="checkbox"/> No
PHOTO LOG: (Photo number, time/date, direction photo is facing, description of photographed subject)					
General Notes: (Well observations/ conditions, reason if deviation from SAP/ Protocol)					
Field Screening Results: (Hach Ferrous Iron)					
0.04					
SAMPLER(S) SIGNATURE: 					



**MOKEY MOUNTAIN SMELTERS**  
Knoxville, Knox County, Tennessee

**June 2014**

**Quarterly Event 4**  
**Remedial Investigation / Feasibility Study**

**Groundwater Sampling Log**  
**Book 3 of 3**



**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**





MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS

# INSTRUMENT AND CALIBRATION LOG

**Site Name:**

[illegible]

Each instrument will be calibrated using calibration standards provided by the manufacturer or instrument vendor at the beginning of each work day, after battery replacement during each work day, after sensor maintenance during each work day, and after a failed calibration verification. Calibration consists of stabilization and electronic "spanning" of the instrument/sensor response to the calibration standard set via instrument software and manufacturer's instructions. Calibration verification consists of stabilization of the instrument/sensor with the calibration standard set to verify response within +/- 10% of the calibration standard set value. Calibration verification will be performed immediately following calibration, at the end of each instrument use period (ie before turning the instrument off), at initiation of instrument use after restarting (ie after turning the instrument on after a shutdown during the work day), at any time during the work period when instrument readings are suspect, and at any time directed by the FOL. Include the unit of measure, i.e. "mV", "S.U.", "NTU", etc. in the calibration value column. THE FOL WILL REVIEW THIS CALIBRATION LOG AND COMPLETE THE FORM WITH HIS/HER SIGNATURE AT THE END OF EACH WORK DAY.

FOL Name: \_\_\_\_\_

FOL Signature: \_\_\_\_\_





MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS

# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 6/24/14
WELL NO: MW10A	SAMPLE ID: MW10A	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: Partly cloudy 80°		

## PURGING DATA

Well Type: <i>PVC</i>	Pump: (S/N): <i>020321 submersible</i>	Total Well Depth (feet): <i>29.63</i>
Well Diameter (inches): <i>2</i>	Water Quality Meter: (S/N): <i>020609</i>	Screen Interval (feet)
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet): <i>28.72</i>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <i>903827</i>	Tubing Depth (Begin/End)

1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity  
= (29.63 feet - 28.77 feet) X 0.16 gallons/foot = gallons

Volume to be Purged (gallons):

Total Volume Purged (gallons):

**Purge Method:** Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\pm 0.1$  unit; Turbidity:  $<10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes <input checked="" type="checkbox"/> No	Filter Size: _____	Duplicate: <input checked="" type="checkbox"/> No	Duplicate ID: MW1DA	Time: _____	MS/MSD: Yes <input checked="" type="checkbox"/> No
<b>PHOTO LOG:</b> (Photo number, time/date, direction photo is facing, description of photographed subject)					
<b>General Notes:</b> (Well observations/ conditions, reason if deviation from SAP/ Protocol)					
Well dry, filled flow-through cell and stopped. waited 10 min and nothing					
<b>Field Screening Results:</b> (Hach Ferrous Iron)					

**SAMPLER(S) SIGNATURE:**





# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 6/24/14
WELL NO:	SAMPLE ID: MW10B	SAMPLE TIME: 1152
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type: <b>PVC</b>	Pump: (S/N):	Total Well Depth (feet): <b>70.7</b>
Well Diameter (inches): <b>2 in</b>	Water Quality Meter: (S/N): <b>see previous page</b>	Screen Interval (feet)
Tubing Diameter (inches): <b>3/16 ID x 0.25 OD</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet): <b>28.23</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End)
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                feet –                feet ) X                gallons/foot =                gallons		Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")		Total Volume Purged (gallons):

[illegible]

**Well Capacity (Gal/Ft):** 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0028; 5/16" = 0.004; 3/8" = 0.008; 1/2" = 0.010; 5/8" = 0.016  
**Stabilizing Criteria Range:** **Specific Conductance:** ≤ 5%; **Dissolved Oxygen:** ≥ 0.2 mg/L or 10% saturation, **pH:** ≥ 0.1 unit; **Turbidity:** <10 NTU


## FIELD SCREENING SUMMARY

Field Filtered: Yes/ <u>No</u>	Filter Size: _____	Duplicate: Yes/ <u>No</u>	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ <u>No</u>
<b>PHOTO LOG:</b> (Photo number, time/date, direction photo is facing, description of photographed subject)					
<b>General Notes:</b> (Well observations/ conditions, reason if deviation from SAP/ Protocol)					
<b>Field Screening Results:</b> (Hach Ferrous Iron)					
0.00					

**SAMPLER(S) SIGNATURE:**





PURGING DATA			
Well Type:	Pump: (S/N):	<div style="text-align: center;"> <p><i>SAME AS PAGE 1</i></p>  </div>	Total Well Depth (feet):
Well Diameter (inches):	Water Quality Meter: (S/N):		<div style="text-align: center;"> <p><i>24.85</i></p> <p>Screen Interval (feet)</p> </div>
Tubing Diameter (inches):	Turbidity Meter: (S/N):		Static Depth to Water (feet)
3/16ID x 0.25OD Tubing Material: PTFE (Teflon)	Water Level Indicator: (S/N):		<div style="text-align: center;"> <p><i>15.84</i></p> <p>Tubing Depth (Begin/End)</p> </div>
<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                      feet                      ) X                      gallons/foot                      =                      gallons			Volume to be Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")			Total Volume Purged (gallons):

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance: + 5%; Dissolved Oxygen: + 0.2 mL/l or 10% saturation. pH: + 0.1 unit; Turbidity: <10 NTU

## FIELD SCREENING SUMMARY

Page 3 of 8





## GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 06/25/2014
WELL NO: SMSMW1A	SAMPLE ID: SMSMW1A	SAMPLE TIME: 1212
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: cloudy, drizzle		

## PURGING DATA

Well Type: <b>FLOSH</b>	Pump: (S/N): <b>021017, submersible</b>	Total Well Depth (feet): <b>40 ft.</b>
Well Diameter (inches): <b>2</b>	Water Quality Meter: (S/N): <b>YST R7341 (ASHTAD)</b>	Screen Interval (feet):
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N): <b>#024477 HACH2100R</b>	Static Depth to Water (feet): <b>34.0R</b>
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N): <b>#903827, Solinst</b>	Tubing Depth (Begin/End):

$$1 \text{ WELL VOLUME PURGE} = (\text{Total Well Depth} - \text{Static Depth to Water}) \times \text{Well Capacity}$$
$$= (40 \text{ feet} - 3.198 \text{ feet}) \times 110 \text{ gallons/foot} = 30.3 \text{ gallons}$$

**Purge Method:** Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")

Volume to be Purged (gallons):

Total Volume Purged (gallons):

Time	Volume Purged (gal)	Total Volume Purged (gal)	Depth to Water (feet)	Temp. (°C)	Specific Conductance (ns/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTUs)	Odor/ Color Observation
0800	1.0	1.0	35.6	17.87	41.33	0.32	6.25	145.6	477	brown
0830	1.0	2.0	35.58	19.25	46.02	0.25	6.28	75.5	77.6	brownish
0915	1.0	3.0	35.53	19.42	46.03	1.2	6.30	63.3	24.8	clear
0922	.50	3.0	35.58	19.24	45.89	1.84	6.33	106.2	12.8	clear
0931	.50	3.5	35.56	19.23	45.79	.11	6.30	85.2	++	brown
1101	.50	4.0	35.41	18.63	45.85	.44	6.39	260.1	+++	brown
1121	1.00	5.0	35.55	19.36	46.08	.62	6.33	253.0	251	clear
1238	4.00	7.0	35.56	18.14	46.06	1.00	6.39	199.2	10.5	clear

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0028; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\leq 1$  unit; Turbidity:  $< 10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No	Filter Size: _____	Duplicate: Yes/No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No
<b>PHOTO LOG:</b> (Photo number, time/date, direction photo is facing, description of photographed subject)					
<b>General Notes:</b> (Well observations/ conditions, reason if deviation from SAP/ Protocol)					
<b>Field Screening Results:</b> (Hach Ferrous Iron)					

**SAMPLER(S) SIGNATURE:**





SITE NAME: Smokey Mountain Smelter Site		SITE LOCATION: Knoxville, Tennessee		DATE: 6/25/2014	
WELL NO: MW03B		SAMPLE ID: MW03B		SAMPLE TIME: 1545	
WEATHER CONDITIONS/ GENERAL OBSERVATIONS: Sunny, hot					

Sunny, host  
PURGING DATA

Well Type: <b>Flush</b>	Pump: (S/N):	Total Well Depth (feet): <b>66</b>
Well Diameter (Inches):	Water Quality Meter: (S/N):	Screen Interval (feet):
Tubing Diameter (Inches): <b>2</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet):
<b>3/16ID x 0.25OD</b>	Water Level Indicator: (S/N):	<b>34.64</b>
Tubing Material:		Tubing Depth (Begin/End):
<b>PTFE (Teflon)</b>		

1 WELL VOLUME PURGE = (Total Well Depth - Static Depth to Water) X Well Capacity  
= (66 feet - 34.64 feet) X 16 gallons/foot = 508.3 gallons

**Purge Method:** Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")

Volume to be Purged (gallons):

Total Volume Purged (gallons):

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
 Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
 Stabilization Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\pm 0.1$  unit; Turbidity:  $< 10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/No	Filter Size: _____	Duplicate: Yes/No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/No
PHOTO LOG: (Photo number, time/date, direction photo is facing, description of photographed subject)					
General Notes: (Well observations/ conditions, reason if deviation from SAP/ Protocol)					
Field Screening Results: (Hach Ferrous Iron)					
19 mg/L					
SAMPLER(S) SIGNATURE: _____					





MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS

# GROUNDWATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelter Site	SITE LOCATION: Knoxville, Tennessee	DATE: 02/26/2014
WELL NO: MW4A	SAMPLE ID: SMSMW4A	SAMPLE TIME: 0907
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Well Type: <i>FW80</i>	Pump: (S/N):	Total Well Depth (feet): <i>43</i>
Well Diameter (inches): <i>2</i>	Water Quality Meter: (S/N):	Screen Interval (feet):
Tubing Diameter (inches): <b>3/16ID x 0.25OD</b>	Turbidity Meter: (S/N):	Static Depth to Water (feet):
Tubing Material: <b>PTFE (Teflon)</b>	Water Level Indicator: (S/N):	Tubing Depth (Begin/End): <i>39-50</i>

*Same as  
on previous  
page*

$$\text{1 WELL VOLUME PURGE} = (\text{Total Well Depth} - \text{Static Depth to Water}) \times \text{Well Capacity}$$

$$= (\text{feet} - \text{feet}) \times \text{gallons/foot} = \text{gallons}$$

Volume to be Purged (gallons):

Total Volume Purged (gallons):

**Purge Method:** Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")

[illegible]

**Well Capacity (Gal/Ft):** 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88

**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

**Stabilization Criteria Range:** Specific Conductance:  $\pm 5\%$ ; Dissolved Oxygen:  $\pm 0.2$  mg/L or 10% saturation, pH:  $\pm 0.1$  unit; Turbidity:  $<10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size: _____	Duplicate: Yes/ No	Duplicate ID: _____	Time: _____	MS/MSD: Yes/ No
<b>PHOTO LOG:</b> (Photo number, time/date, direction photo is facing, description of photographed subject)					
<b>General Notes:</b> (Well observations/ conditions, reason if deviation from SAP/ Protocol)					
<b>Field Screening Results:</b> (Hach Ferrous Iron)					

**SAMPLER(S) SIGNATURE:**



**SMOKEY MOUNTAIN SMELTERS**  
**KNOXVILLE, TENNESSEE**

**June 2014**  
**RI/FS Quarterly Groundwater Sampling Event**

**Soil Vapor Sampling Log**



**J.M.WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**





J.M. WALLER  
ASSOCIATES, INC.

MANAGING THE VISION | ENVIRONMENTAL | FACILITIES | LOGISTICS

## SOIL VAPOR SAMPLING LOG

SITE NAME: Smokey Mountain Smelters	SITE LOCATION: Knoxville, Tennessee	DATE: 6/25/14
LOCATION NO: SMS SV 14	SAMPLE ID: SMS SV 14	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Hole Diameter (inches): ~3.5"	Pump Type: _____	sample Purge Start: 0755
Tubing Diameter (inches): 3/16" ID	Organic Vapor Meter: _____	Flow Rate: _____
Tubing Material: FEP LINED	Organic Vapor Reading: _____	Purge Complete: 1610
VOLUME PURGE = ID of Rod X Capacity Multiplier X Feet of Rod X 0.134 Gal/CF		Total Volume Purged (gallons):

Well Capacity (Gal/Ft): CMT = 0.0106; 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.008; 1/2" = 0.010; 5/8" = 0.016

### SAMPLING SUMMARY

Duplicate: Yes/ No		Duplicate ID:		Time:	MS/MSD: Yes/ No
Sample Analysis	Number of Containers	Type of Container	Canister ID	Preservation	Holding Time
Summa Canister	1	10512/1425	Fill to Capacity	None	7 days
Notes: LEAK TEST 1700 PPM HE IN SHROUD, 0 PPM HE IN SV LINE Summa to SERIAL # 1514 FLOW CONT # 10593 6/25 LEAK TEST 1425 09906 5% HE IN SHROUD 0 PPM IN TUBING					
SAMPLER(S) SIGNATURE:					

## SOIL VAPOR SAMPLING LOG

SITE NAME: Smokey Mountain Smelters	SITE LOCATION: Knoxville, Tennessee	DATE: 6/24/14
LOCATION NO:	SAMPLE ID: SMS SV 10-20	SAMPLE TIME: 1648
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Hole Diameter (inches):	Pump Type: _____	sample START Purge Start: 1648 - 30 inHg
Tubing Diameter (inches): 1/4" ID	Organic Vapor Meter: P.O. MIN. RAE 021925	Flow Rate: 760 cc
Tubing Material: FEP LINED	Organic Vapor Reading: 0.1	Purge Complete: 1700 - 2 inHg
VOLUME PURGE = ID of Rod X Capacity Multiplier X Feet of Rod X 0.134 Gal/CF		Total Volume Purged (gallons):

Well Capacity (Gal/Ft): CMT = 0.0106; 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.008; 1/2" = 0.010; 5/8" = 0.016

### SAMPLING SUMMARY

Duplicate: Yes/ No		Duplicate ID: 0		Time:	MS/MSD: Yes/ No
Sample Analysis	Number of Containers	Type of Container	Canister ID	Preservation	Holding Time
Summa Canister	1	1L Summa	561223	None	7 days
Notes: LEAK TEST 4.5% in SHROUD, 0 PPM in SV LINE					
SAMPLER(S) SIGNATURE:					





## SOIL VAPOR SAMPLING LOG

SITE NAME: Smokey Mountain Smelters	SITE LOCATION: Knoxville, Tennessee	DATE: 6/25/14
LOCATION NO:	SAMPLE ID: SMS5V15	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Hole Diameter (inches): 8.5"	Pump Type:	Purge Start: 0803
Tubing Diameter (inches): 3/16" ID	Organic Vapor Meter:	Flow Rate: 30"/-30"
Tubing Material: FEL LINED	Organic Vapor Reading:	INITIAL PRESSURE: 1610
VOLUME PURGE = ID of Rod X Capacity Multiplier X Feet of Rod X 0.134 Gal/CF		Total Volume Purged (gallons):

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

## SAMPLING SUMMARY

Duplicate: Yes/No Duplicate ID: CAN 12308/10509		Time: FLOW CONT: 10633		MS/MSD: Yes/No	
Sample Analysis	Number of Containers	Type of Container	Canister ID	Preservation	Holding Time
Summa Canister	1		Fill to Capacity	None	7 days
Notes: CANISTER 7469/69723 ROW # 09868					

SAMPLER(S) SIGNATURE:

## SOIL VAPOR SAMPLING LOG

SITE NAME: Smokey Mountain Smelters	SITE LOCATION: Knoxville, Tennessee	DATE: 6/25/14
LOCATION NO:	SAMPLE ID: SMS5V15 16	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

## PURGING DATA

Hole Diameter (inches): NA	Pump Type: NA	Purge Start: 0810
Tubing Diameter (inches): 3/16" ID	Organic Vapor Meter: PID MINIRAE	Flow Rate: INITIAL PRESSURE
Tubing Material: FEL LINED	Organic Vapor Reading: 0.1 PPM	Purge Complete: 28.5 MIN
VOLUME PURGE = ID of Rod X Capacity Multiplier X Feet of Rod X 0.134 Gal/CF		Total Volume Purged (gallons):

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

## SAMPLING SUMMARY

Duplicate: Yes/No Duplicate ID: CAN 12270/09769		Time: CONTAINER 10861		MS/MSD: Yes/No	
Sample Analysis	Number of Containers	Type of Container	Canister ID	Preservation	Holding Time
Summa Canister	1		Fill to Capacity	None	7 days
Notes: CAN 12270/09769 CONTAINER 10861					

SAMPLER(S) SIGNATURE:



## SOIL VAPOR SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 6/25/14
<b>LOCATION NO:</b>	<b>SAMPLE ID:</b> SMSSV AMBIENT	<b>SAMPLE TIME:</b>
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b>		

### PURGING DATA

Hole Diameter (Inches): NA	Pump Type: —	Purge Start: 0812
Tubing Diameter (Inches): NA	Organic Vapor Meter: —	Flow Rate: PRESSURE - 30" Hg
Tubing Material: NA	Organic Vapor Reading: —	Purge Complete:
<b>VOLUME PURGE</b> = ID of Rod X Capacity Multiplier X Feet of Rod X 0.134 Gal/CF		<b>Total Volume Purged (gallons):</b>

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

### SAMPLING SUMMARY

Duplicate: Yes/ No Duplicate ID:		Time:		MS/MSD: Yes/ No	
<b>Sample Analysis</b>	<b>Number of Containers</b>	<b>Type of Container</b>	<b>Canister ID</b>	<b>Preservation</b>	<b>Holding Time</b>
Summa Canister	1		Fill to Capacity	None	7 days
Notes: CANISTER 1514/10576 CONTROLLED 10593					

**SAMPLER(S) SIGNATURE:**

## SOIL VAPOR SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 6/25/14
<b>LOCATION NO:</b>	<b>SAMPLE ID:</b> SMSSV08-15	<b>SAMPLE TIME:</b>
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b>		

### PURGING DATA

Hole Diameter (Inches): ~1"	Pump Type: —	Purge Start: 1026
Tubing Diameter (Inches): 3/16"	Organic Vapor Meter:	Flow Rate: -28" Hg
Tubing Material: REPLINED	Organic Vapor Reading: PID = 0.0 ppm	Purge Complete: 1115 -21.5" Hg
<b>VOLUME PURGE</b> = ID of Rod X Capacity Multiplier X Feet of Rod X 0.134 Gal/CF		<b>Total Volume Purged (gallons):</b> ~ 600 cc

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

### SAMPLING SUMMARY

Duplicate: Yes/ No Duplicate ID:		Time:		MS/MSD: Yes/ No	
<b>Sample Analysis</b>	<b>Number of Containers</b>	<b>Type of Container</b>	<b>Canister ID</b>	<b>Preservation</b>	<b>Holding Time</b>
Summa Canister	1		5779 10149 Fill to Capacity	None	7 days

Notes: LEAK TEST 3200 PPM AT HE IN SHROUD 0.0 PPM in TUBING  
TIGHT CLAY MATERIAL LEADS TO SLOW CAN FILL. (REGUSAL)  
AN ATTEMPT WAS MADE TO COLLECT GROUND WATER AT SV08. DPT TO 41' HOLE WAS DRY.

**SAMPLER(S) SIGNATURE:**





J.M. WALLER  
ASSOCIATES, INC.

MANAGING THE VISION | ENVIRONMENTAL | FACILITIES | LOGISTICS

## SOIL VAPOR SAMPLING LOG

SITE NAME: Smokey Mountain Smelters	SITE LOCATION: Knoxville, Tennessee	DATE: 6/25/14
LOCATION NO: SMS SV 13	SAMPLE ID: SMS SV 13-11	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Hole Diameter (inches):	Pump Type: <u>PID</u>	Purge Start: 1240
Tubing Diameter (inches): <u>SAME</u>	Organic Vapor Meter: <u>PID</u>	Flow Rate: -28.5" Hg
Tubing Material:	Organic Vapor Reading: 0.0 PPM	Purge Complete: 1257 -12.5" Hg
VOLUME PURGE = ID of Rod X Capacity Multiplier X Feet of Rod X 0.134 Gal/CF		Total Volume Purged (gallons): 8

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

### SAMPLING SUMMARY

Duplicate: Yes/No Duplicate ID: <u>0</u>		Time:		MS/MSD: Yes/ No	
Sample Analysis	Number of Containers	Type of Container	Canister ID 5158/10344	Preservation	Holding Time
Summa Canister	1		Full Capacity	None	7 days
Notes: LEAK CHECK 4.790 HE IN STRAND 0.0 PPM IN TUBING 480 CC PURGE.					

SAMPLER(S) SIGNATURE:

## SOIL VAPOR SAMPLING LOG

SITE NAME: Smokey Mountain Smelters	SITE LOCATION: Knoxville, Tennessee	DATE: 6/25/14
LOCATION NO:	SAMPLE ID: SMS SV 11-11	SAMPLE TIME:
WEATHER CONDITIONS/ GENERAL OBSERVATIONS:		

### PURGING DATA

Hole Diameter (inches):	Pump Type:	Purge Start: 1340
Tubing Diameter (inches): <u>SAME</u>	Organic Vapor Meter: <u>PID</u>	Flow Rate: -29" Hg
Tubing Material:	Organic Vapor Reading: 0.0 PPM	Purge Complete: 1349 0" Hg
VOLUME PURGE = ID of Rod X Capacity Multiplier X Feet of Rod X 0.134 Gal/CF		Total Volume Purged (gallons):

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

### SAMPLING SUMMARY

Duplicate: Yes/No Duplicate ID: <u>0</u>		Time:		MS/MSD: Yes/ No	
Sample Analysis	Number of Containers	Type of Container	Canister ID 09141/L8187	Preservation	Holding Time
Summa Canister	1		Full Capacity	None	7 days
Notes: LEAK TEST: 4800 PPM HE IN STRAND 0 PPM HE IN TUBING 420 CC PURGE					

SAMPLER(S) SIGNATURE:



## SOIL VAPOR SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 6/25/14
<b>LOCATION NO:</b>	<b>SAMPLE ID:</b> SMSV 9-10	<b>SAMPLE TIME:</b>
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b>		

### PURGING DATA

Hole Diameter (inches):	Pump Type:	Purge Start: 1430
Tubing Diameter (inches): Same	Organic Vapor Meter: PID	Flow Rate: ~29" Hg
Tubing Material:	Organic Vapor Reading: 0.0 PPM	Purge Complete: 1445
<b>VOLUME PURGE</b> = ID of Rod X Capacity Multiplier X Feet of Rod X 0.134 Gal/CF		Total Volume Purged (gallons): 360 cc

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

### SAMPLING SUMMARY

Duplicate: Yes/ No		Duplicate ID:		Time:	MS/MSD: Yes/ No
Sample Analysis	Number of Containers	Type of Container	Canister ID	Preservation	Holding Time
Summa Canister	1	1L Summa	10338/LA2115	None	7 days
Notes: LEAK TEST 2.5% HE IN SHROUD 0.0 PPM IN SAMPLE TUBE					

**SAMPLER(S) SIGNATURE:** [Signature]

## SOIL VAPOR SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 6/25/14
<b>LOCATION NO:</b>	<b>SAMPLE ID:</b> SMSV 4-15	<b>SAMPLE TIME:</b>
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b>		

### PURGING DATA

Hole Diameter (inches):	Pump Type:	Purge Start: 1544
Tubing Diameter (inches):	Organic Vapor Meter: PID	Flow Rate: ~29" Hg
Tubing Material:	Organic Vapor Reading: 0.0 PPM	Purge Complete: 1558
<b>VOLUME PURGE</b> = ID of Rod X Capacity Multiplier X Feet of Rod X 0.134 Gal/CF		Total Volume Purged (gallons): ~1500 cc

Well Capacity (Gal/Ft): CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

### SAMPLING SUMMARY

Duplicate: Yes/ No		Duplicate ID:		Time:	MS/MSD: Yes/ No
Sample Analysis	Number of Containers	Type of Container	Canister ID	Preservation	Holding Time
Summa Canister	1	1L Summa	10518/LA7109	None	7 days
Notes: LEAK TEST 1: 2.5% HE IN SHROUD ~500 PPM IN TUBING. TEST 2: ~700 PPM IN SHROUD, 25 PPM IN TUBING.					

**SAMPLER(S) SIGNATURE:** [Signature]



## SOIL VAPOR SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 6/25/14
<b>LOCATION NO:</b>	<b>SAMPLE ID:</b> SMS SV3-110	<b>SAMPLE TIME:</b>
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b>		

### PURGING DATA

<b>Hole Diameter (inches):</b>	<b>Pump Type:</b>	<b>Purge Start:</b> 11:22
<b>Tubing Diameter (inches):</b> SAME	<b>Organic Vapor Meter:</b> PID	<b>Flow Rate:</b> -28" H <sub>2</sub> O
<b>Tubing Material:</b>	<b>Organic Vapor Reading:</b> 0.0 ppm	<b>Purge Complete:</b> 11:44 -4" H <sub>2</sub> O
<b>VOLUME PURGE</b> = ID of Rod X Capacity Multiplier X Feet of Rod X 0.134 Gal/CF		<b>Total Volume Purged (gallons):</b> 360 CC

**Well Capacity (Gal/Ft):** CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

### SAMPLING SUMMARY

<b>Duplicate:</b> Yes/No		<b>Duplicate ID:</b> SMS SV3 D-11		<b>Time:</b> 09:12/L-5184	<b>MS/MSD:</b> Yes/No
<b>Sample Analysis</b>	<b>Number of Containers</b>	<b>Type of Container</b>	<b>Canister ID</b>	<b>Preservation</b>	<b>Holding Time</b>
Summa Canister	1		09668/LS177 Fill to Capacity	None	7 days
<b>Notes:</b> LEAK TEST: 7800 PPM UNDER SHROUD, 0.0 PPM IN TUBING					

**SAMPLER(S) SIGNATURE:**

## SOIL VAPOR SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b>
<b>LOCATION NO:</b>	<b>SAMPLE ID:</b>	<b>SAMPLE TIME:</b>
<b>WEATHER CONDITIONS/ GENERAL OBSERVATIONS:</b>		

### PURGING DATA

<b>Hole Diameter (inches):</b>	<b>Pump Type:</b>	<b>Purge Start:</b>
<b>Tubing Diameter (inches):</b>	<b>Organic Vapor Meter:</b>	<b>Flow Rate:</b>
<b>Tubing Material:</b>	<b>Organic Vapor Reading:</b>	<b>Purge Complete:</b>
<b>VOLUME PURGE</b> = ID of Rod X Capacity Multiplier X Feet of Rod X 0.134 Gal/CF		<b>Total Volume Purged (gallons):</b>

**Well Capacity (Gal/Ft):** CMT = 0.0106, 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
**Tubing Inside Diameter Capacity (Gal/Ft):** 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

### SAMPLING SUMMARY

<b>Duplicate:</b> Yes/No		<b>Duplicate ID:</b>		<b>Time:</b>	<b>MS/MSD:</b> Yes/No
<b>Sample Analysis</b>	<b>Number of Containers</b>	<b>Type of Container</b>	<b>Canister ID</b>	<b>Preservation</b>	<b>Holding Time</b>
Summa Canister	1		Fill to Capacity	None	7 days
<b>Notes:</b>					

**SAMPLER(S) SIGNATURE:**





### PURGING DATA

## PURGING DATA

<b>1 WELL VOLUME PURGE</b> = (Total Well Depth – Static Depth to Water) X Well Capacity = (                      feet                      –                      feet                      ) X                      gallons/foot                      =                      gallons	Volume to be Purged (gallons):  Total Volume Purged (gallons):
<b>Purge Method:</b> Traditional Multiple Volume Purge ("Sipping from the Top") or Low-Flow ("Tubing in Mid Screen")	

[illegible]

Well Capacity (Gal/Ft): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88  
Tubing Inside Diameter Capacity (Gal/Ft): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0028; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016  
Stabilization Criteria Range: Specific Conductance:  $\leq 5\%$ ; Dissolved Oxygen:  $\geq 0.2$  mg/L or 10% saturation, pH:  $\leq 0.1$  unit; Turbidity:  $< 10$  NTU

## FIELD SCREENING SUMMARY

Field Filtered: Yes/ No	Filter Size:	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No
<b>PHOTO LOG:</b> (Photo number, time/date, direction photo is facing, description of photographed subject)					
<b>General Notes:</b> (Well observations/ conditions, reason if deviation from SAP/ Protocol)					
<b>Field Screening Results:</b> (Hach Ferrous Iron)					
0.21 mg/L					

**SAMPLER(S) SIGNATURE:**



**SMOKEY MOUNTAIN SMELTERS**  
Knoxville, Knox County, Tennessee

**June 2014**

**Quarterly Event 4**

**Remedial Investigation / Feasibility Study**

**Surface Water Sampling Log**

**Book 1 of 2**



**J.M.WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**







# SURFACE WATER SAMPLING LOG

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 02/22/14			
SAMPLE ID: SMSSW14-DRY		SAMPLE TIME:					
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
							Range :
							Result:
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No	
SAMPLER(S) SIGNATURE:							

Notes:

DRY, Could not sample, see page 2 of 6 in this book for more info.

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 07/22/14			
SAMPLE ID: SMSSW13		SAMPLE TIME: 1415					
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
1415	17.44	9.12	8.61	7.29	38.7	3.90	Range :
							Result: 0.00
Stream Flow rate: 5/10 = 1.5 ft/s		Stream width: 5 feet		Stream depth: 4 inches			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No	
SAMPLER(S) SIGNATURE:							

Notes:

Photo: 2014-06-22 14.20.33, facing SW

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 08/22/14			
SAMPLE ID: SMSEW09		SAMPLE TIME: 1455					
Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
1455	18.41	11.03	7.57	7.67	160.45	5.78	Range :
							Result: .07
Stream Flow rate: .6 ft/s		Stream width: 7 feet		Stream depth: 6 inches			
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No	Duplicate ID:	Time:	MS/MSD: Yes/ No	
SAMPLER(S) SIGNATURE:							

Notes:

Photo: 2014-08-22 14.56.49, June 22 @ 14:56 facing North





# SURFACE WATER SAMPLING LOG

AG

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 06/22/14			
SAMPLE ID: SWSW14				SAMPLE TIME: 11:00			
Time	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
11:00	18.68	528	7.34	7.80	135.3	4.02	Range: Result: 2.04
Stream Flow rate: 2 ft/s		Stream width: 12 feet		Stream depth: 1 foot			
Field Filtered: Yes/No		Filter Size:	Duplicate: Yes/No	Duplicate ID:	Time:	MS/MSD: Yes/No	
SAMPLER(S) SIGNATURE: [Signature]							

Notes: Went back to SWSW14 after sampling SWSW13 and SWSW09 to take a picture of the location, found water to sample. Photo # 2014-06-22 15:20:03,

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 06/22/14			
SAMPLE ID: SWSW09 SPRING				SAMPLE TIME: 11:45			
Time	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
11:45	17.87	893	8.60	7.73	157.8	3.6	Range: Result: 3.6
Stream Flow rate: 5 ft/s		Stream width: 3 ft.		Stream depth: 3 ft.			
Field Filtered: Yes/No		Filter Size:	Duplicate: Yes/No	Duplicate ID:	Time:	MS/MSD: Yes/No	
SAMPLER(S) SIGNATURE: [Signature]							

Facing East

Notes: Photo-see SWSW09

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 6/23/14			
SAMPLE ID: SWSW08 Spring				SAMPLE TIME: 9:07			
Time	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
9:07	18.45	1598	7.74	7.4	171.2	3.41	Range: Result: 0.0
Stream Flow rate:		Stream width:		Stream depth:			
Field Filtered: Yes/No		Filter Size:	Duplicate: Yes/No	Duplicate ID:	Time:	MS/MSD: Yes/No	
SAMPLER(S) SIGNATURE:							

Notes: Photo: 2014-06-23 08:43:42  
08:44:08  
08:44:19



# SURFACE WATER SAMPLING LOG

SMSW02 Photos-  
2014-06-23 10.20  
facing NE

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 6/23/14	
SAMPLE ID: SMSW08		SAMPLE TIME: 722			

Time	Temp. (°C)	Specific Conductance (ns/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Ferrous Iron (Field Test)
922	17.65	1.683	7.29	7.54	185	3.16	Range : Result: 0.0

Stream Flow rate: NA	Stream width: NA	Stream depth: NA
Field Filtered: Yes/No	Filter Size:	Duplicate: Yes/No Duplicate ID: Time: MS/MSD: Yes/No

SAMPLER(S) SIGNATURE:

Notes: Photo: 2014-06-23 08.47.20  
08.47.34 facing N

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 6/23/14	
SAMPLE ID: SMSW04		SAMPLE TIME:			

Time	Temp. (°C)	Specific Conductance (ns/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
1000	18.28	10.36	0.46	6.6	192.3	6.62	Range : Result: 0.0

Stream Flow rate:	Stream width:	Stream depth:
Field Filtered: Yes/No	Filter Size:	Duplicate: Yes/No Duplicate ID: SMSW94 Time: 1010 MS/MSD: Yes/No

SAMPLER(S) SIGNATURE:

Notes: Photo: 2014-06-23-09.21.24  
09.21.44 facing NE

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 06/23/14	
SAMPLE ID: SMSW02-DRY		SAMPLE TIME:			

Time	Temp. (°C)	Specific Conductance (ns/cm or µS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
							Range : Result:

Stream Flow rate:	Stream width:	Stream depth:
Field Filtered: Yes/No	Filter Size:	Duplicate: Yes/No Duplicate ID: Time: MS/MSD: Yes/No

SAMPLER(S) SIGNATURE:

Notes: DRY





J.M. WALLER  
ASSOCIATES, INC.

MANAGING THE VISION | ENVIRONMENTAL | FACILITIES | LOGISTICS

# SURFACE WATER SAMPLING LOG

2015, 10

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 07/23/2014	
SAMPLE ID: SMSSW03 - DRY				SAMPLE TIME:	

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Ferrous Iron (Field Test)
							Range:
							Result:

Stream Flow rate:	Stream width:	Stream depth:
Field Filtered: Yes/No	Filter Size:	Duplicate: Yes/No
Duplicate ID:	Time:	MS/MSD: Yes/No

SAMPLER(S) SIGNATURE: *[Signature]*

Notes:

DRY

Photo: 2014-06-29

13.08.42

13.08.82 facings

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 06/24/2014	
SAMPLE ID: SMSSW10				SAMPLE TIME: 0900	

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
0900	26.84	301	6.05	7.01	187.3	28.2	Range:
							Result: 710 mg/l

Stream Flow rate: 0.0	Stream width: 20 ft	Stream depth: 2 ft
Field Filtered: Yes/No	Filter Size:	Duplicate: Yes/No
Duplicate ID:	Time:	MS/MSD: Yes/No

SAMPLER(S) SIGNATURE: *[Signature]*

Notes:

Photo: 2014-06-24 08:55.23

SITE NAME: Smokey Mountain Smelters		SITE LOCATION: Knoxville, Tennessee		DATE: 06/24/2014	
SAMPLE ID: SMSSW20				SAMPLE TIME: 0919	

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)
0919	27.11	286	6.19	7.91	160.7	15.3	Range:
							Result: 30.0 mg/l

Stream Flow rate: 0.0	Stream width: 50 ft	Stream depth: 10 ft
Field Filtered: Yes/No	Filter Size:	Duplicate: Yes/No
Duplicate ID:	Time:	MS/MSD: Yes/No

SAMPLER(S) SIGNATURE: *[Signature]*

Notes:

Photo: 2014-06-24 09-14-56



## SURFACE WATER SAMPLING LOG

<b>SITE NAME:</b> Smokey Mountain Smelters			<b>SITE LOCATION:</b> Knoxville, Tennessee			<b>DATE:</b> 06/24/2014		
<b>SAMPLE ID:</b> SIM55W05			<b>SAMPLE TIME:</b> 0940					

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Flow Rate	Ferrous Iron (Field Test)
0940	27.0	543	5.44	7.64	132.5	25.6		Range : Result: 0.0
Stream Flow rate: 0.0		Stream width: 50 ft.		Stream depth: 2 feet				
Field Filtered: Yes/No		Filter Size:	Duplicate: Yes/No		Duplicate ID:	Time:		MS/MSD: Yes/No
<b>SAMPLER(S) SIGNATURE:</b> <i>[Signature]</i>								

Notes:

<b>SITE NAME:</b> Smokey Mountain Smelters			<b>SITE LOCATION:</b> Knoxville, Tennessee			<b>DATE:</b>		
<b>SAMPLE ID:</b>			<b>SAMPLE TIME:</b>					

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)	
							Range : Result:	
Stream Flow rate:		Stream width:		Stream depth:				
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No		Duplicate ID:	Time:		MS/MSD: Yes/ No
<b>SAMPLER(S) SIGNATURE:</b>								

Notes:

<b>SITE NAME:</b> Smokey Mountain Smelters			<b>SITE LOCATION:</b> Knoxville, Tennessee			<b>DATE:</b>		
<b>SAMPLE ID:</b>			<b>SAMPLE TIME:</b>					

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turbidity (NTU)	Fe (capsule)	
							Range : Result:	
Stream Flow rate:		Stream width:		Stream depth:				
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No		Duplicate ID:	Time:		MS/MSD: Yes/ No
<b>SAMPLER(S) SIGNATURE:</b>								

Notes:



**SMOKEY MOUNTAIN SMELTERS**  
Knoxville, Knox County, Tennessee

**June 2014**

**Quarterly Event 4**

**Remedial Investigation / Feasibility Study**

**Surface Water Sampling Log**

**Book 2 of 2**



**J.M. WALLER®**  
**ASSOCIATES, INC.**

**MANAGING THE VISION® | ENVIRONMENTAL | FACILITIES | LOGISTICS**





## 3

[illegible]

FOL Name:

FOL Signature: \_\_\_\_\_



# **SURFACE WATER SAMPLING LOG**

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 6/22/14
<b>SAMPLE ID:</b> SW01/SMSSW01		<b>SAMPLE TIME:</b> 1513

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turb (NTU)	Hexavalent Chromium (Must Filter)	Fe (capsule)
1513	17.38	0.284	8.31	7.47	72.2	9.56	YES <input type="radio"/> NO <input checked="" type="radio"/>	Range : Result: 0.61 mg/L
Field Filtered: Yes <input checked="" type="radio"/> No <input type="radio"/>		Filter Size:	Duplicate: Yes <input checked="" type="radio"/> No <input type="radio"/>		Duplicate ID:	Time:	MS/MSD: Yes <input checked="" type="radio"/> No <input type="radio"/>	

**SAMPLER(S) SIGNATURE:**

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b> 6/22/14
<b>SAMPLE ID:</b> SMSSW11		<b>SAMPLE TIME:</b> 1545

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Turb (NTU)	Hexavalent Chromium (Must Filter)	Fe (capsule)
1545	20.94	0.404	7.30	8.02	98.1	4.66	YES <input type="radio"/> NO <input checked="" type="radio"/>	Range : Result: 0.0 mg/L
Field Filtered: Yes <input checked="" type="radio"/> No <input type="radio"/>		Filter Size:	Duplicate: Yes <input checked="" type="radio"/> No <input type="radio"/>		Duplicate ID:	Time:	MS/MSD: Yes <input checked="" type="radio"/> No <input type="radio"/>	

**SAMPLER(S) SIGNATURE:**

<b>SITE NAME:</b> Smokey Mountain Smelters	<b>SITE LOCATION:</b> Knoxville, Tennessee	<b>DATE:</b>
<b>SAMPLE ID:</b>		<b>SAMPLE TIME:</b>

Time	Temp. (°C)	Specific Conductance ms/cm or µS/cm	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Hexavalent Chromium (Must Filter)	Fe (capsule)
						YES <input type="radio"/> NO <input type="radio"/>	Range : Result:
Field Filtered: Yes/ No		Filter Size:	Duplicate: Yes/ No		Duplicate ID:	Time:	MS/MSD: Yes/ No

**SAMPLER(S) SIGNATURE:**



**J.M. Waller Associates, Inc.**

**Remedial Action Contract II Lite, Region IV, Photo Log**

<b>Contract:</b>	EP-S4-08-03	<b>Site Name:</b>	Smokey Mountain Smelters
<b>Task No.:</b>	019	<b>Date:</b>	May 2011
<b>RPM:</b>	Rusty Kestle	<b>Project Mgt.:</b>	Janice Austin
<b>PHOTO LOG</b>			

During the week of May 9, 2011, J.M. Waller conducted a subsurface soil investigation utilizing a direct-push technology (DPT) in the former settling ponds, UST removal area, and former transformer area at Smokey Mountain Smelters. The photographs presented in this photo log are of the 5-foot-long cores with the United Soil Classification System (USCS) description.

**ACKNOWLEDGEMENTS**

<b>SIGNATURE</b>	<b>Date:</b>	<b>PM SIGNATURE</b>	<b>Date:</b>
------------------	--------------	---------------------	--------------





**OFFICIAL PHOTOGRAPH NO. 1**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J08	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0128	<b>Time:</b>	0825
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 - 5.0 ft. interval of soil boring SMS-J08, with the top part of the boring in the right portion of this photo. In the 3.0 - 5.0 ft. section, a PID response of 1.1 ppm was detected. The soil is described as: 0.0 - 3.0 ft.: SILTY CLAY (CL); Red; Dry; Hard; Low Plasticity, 3.0 - 5.0 ft.: SILTY CLAYEY SAND (SM/SC); Gray; Moist; Hard; Angular; Medium Grained; Well Graded; Some Gravel.		





**OFFICIAL PHOTOGRAPH NO. 2**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J08	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0129	<b>Time:</b>	0847
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 - 6.5 ft. interval of soil boring SMS-J08, with the top part of the boring in the right portion of this photo. This is the first of two initial boring attempts where refusal was encountered in the 5.0 - 10.0 ft. zone. The boring was offset approximately 3ft. between attempts and the third attempt was logged and recorded in photo number DSCN0130.		





**OFFICIAL PHOTOGRAPH NO. 3**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J08	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0130	<b>Time:</b>	0905
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 - 10.0 ft. interval of soil boring SMS-J08, with the top part of the boring in the right portion of this photo. In this interval, a PID response was not detected. The soil is described as: 5.0 - 5.5 ft.: SILTY CLAYEY SAND (SM/SC); Gray; Moist; Hard; Angular; Medium Grained; Well Graded; Some Gravel. 5.5 - 6.0 ft.: SILTY SAND (SM); Tan/Blue; Moist; Dense; Well Graded; Medium Grained; Angular. 6.0 - 6.5 ft.: SANDY SILT (ML); Gray; Moist; Hard; Non-Plastic. 6.5 - 10.0 ft.: NO RECOVERY		





**OFFICIAL PHOTOGRAPH NO. 4**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J08	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0131	<b>Time:</b>	0916
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 - 15.0 ft. interval of soil boring SMS-J08, with the top part of the boring in the right portion of this photo. In the 10.0 - 10.5 ft. a PID response of 0.1 ppm was detected. The soil is described as: 10.0 - 10.5 ft.: SANDY SILT (ML); Gray; Moist; Hard; Non-Plastic, 10.5 - 12.0 ft.: CLAY (CH); Orange; Moist; Hard; Plastic. 12.0 - 15.0 ft.: NO RECOVERY		





**OFFICIAL PHOTOGRAPH NO. 5**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J08	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0132	<b>Time:</b>	0941
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 15.0 - 20.0 ft. interval of soil boring SMS-J08, with the top part of the boring in the right portion of this photo. In this interval a PID response of 0.3 ppm was detected. The soil is described as: 15.0 - 20.0 ft.: CLAY (CH); Orange; Moist; Hard; Plastic.		





**OFFICIAL PHOTOGRAPH NO. 6**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J08	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0133	<b>Time:</b>	1006
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 20.0 - 25.0 ft. interval of soil boring SMS-J08, with the top part of the boring in the right portion of this photo. In this interval, a PID response was not detected. The soil is described as: 20.0 - 25.0 ft.: CLAY (CH); Orange; Moist; Hard; Plastic. Note: 25.0 – 30.0 ft. – NO RECOVERY.(no photograph) 30.0 ft.: Total depth.		





**OFFICIAL PHOTOGRAPH NO. 7**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Between Nodes J08 & K08	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0134	<b>Time:</b>	1127
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 - 5.0 ft. interval of soil boring SMS-J/K08, with the top part of the boring in the right portion of this photo. In this interval, a PID response was not detected. The soil is described as: 0.0 - 3.0 ft.: SILTY CLAY (CL); Red; Dry; Hard; Low Plasticity 3.0 - 5.0 ft.: SILTY CLAYEY SAND (SM/SC); Gray; Moist; Dense; Well Graded; Angular; Medium Grained; Some Gravel.		





**OFFICIAL PHOTOGRAPH NO. 8**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Between Nodes J08 & K08	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0135	<b>Time:</b>	1135
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 - 10.0 ft. interval of soil boring SMS-J/K08, with the top part of the boring in the right portion of this photo. In this interval a PID response of 1.0 ppm was detected. The soil is described as: 5.0 - 10.0 ft.: SILTY CLAYEY SAND (SM/SC); Gray; Moist; Hard; Angular; Medium Grained; Well Graded; Some Gravel.		





**OFFICIAL PHOTOGRAPH NO. 9**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Between Nodes J08 & K08	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0136	<b>Time:</b>	1143
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 - 15.0 ft. interval of soil boring SMS-J/K08, with the top part of the boring in the right portion of the photo. In this interval, a PID response of 24.2 ppm was detected. The soil is described as: 10.0 - 15.0 ft.: SILTY CLAYEY SAND (SM/SC); Gray; Moist; Very Soft; Angular; Medium Grained; Well Graded; Some Gravel.		





**OFFICIAL PHOTOGRAPH NO. 10**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Between Nodes J08 & K08	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0137	<b>Time:</b>	1151
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 15.0 - 20.0 ft. interval of soil boring SMS-J/K08. The top part of the boring is in the right portion of the photo. In this interval a PID response of 10.7 ppm was detected. The soil is described as: 10.0 - 15.0 ft.: SILTY CLAYEY SAND (SM/SC); Light Gray; Moist; Very Soft; Angular; Medium Grained; Well Graded; Some Gravel. 19.0 - 20.0 ft.: CLAY (CH); Orange; Moist; Hard; Plastic. 20.0 ft.: Total depth.		





**OFFICIAL PHOTOGRAPH NO. 11**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J09	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0138	<b>Time:</b>	1452
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 - 5.0 ft. interval of soil boring SMS-J09, with the top part of the boring in the right portion of this photo. In the 2.5 – 4.5 ft. section, a PID response of 85.3 ppm was detected. The soil is described as: 0.0 - 2.5 ft.: SILTY CLAY (CL); Red; Dry; Hard; Low Plasticity (Cap) 2.5 - 4.5 ft.: SILTY SAND (SM); Gray; Wet; Medium Dense; Poorly Graded; Medium Grained; Sub-angular. 4.5 - 5.0 ft.: ASPHALT		





**OFFICIAL PHOTOGRAPH NO. 12**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J09	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0139	<b>Time:</b>	1500
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 - 10.0 ft. interval of soil boring SMS-J09, with the top part of the boring in the right portion of this photo. In the 5.0 – 5.5 ft. section, a PID response of 209 ppm was detected. The soil is described as: 5.0 - 5.5 ft.: SILTY SAND (SM); Gray; Moist; Dense; Poorly Graded; Angular. 5.5 - 7.0 ft.: CLAY (CH); Red; Moist; Hard; Plastic. 7.0 - 10.0 ft.: NO RECOVERY		





**OFFICIAL PHOTOGRAPH NO. 13**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J09	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0140	<b>Time:</b>	1508
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 - 15.0 ft. interval of soil boring SMS-J09, with the top part of the boring in the right portion of this photo. In this interval a PID response of 6.4 ppm was detected. The soil is described as: 10.0 - 15.0 ft.: SANDY SILT (ML); Gray; Wet; Hard to soft (Sludge?).		





**OFFICIAL PHOTOGRAPH NO. 14**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J09	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0141	<b>Time:</b>	1521
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 15.0 - 20.0 ft. interval of soil boring SMS-J09, with the top part of the boring in the right portion of this photo. In this interval a PID response of 5.8 ppm was detected. The soil is described as: 15.0 - 20.0 ft.: SANDY SILT (ML); Gray; Wet; Soft (Sludge?).		





**OFFICIAL PHOTOGRAPH NO. 15**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J09	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0142	<b>Time:</b>	1534
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 20.0 - 25.0 ft. interval of soil boring SMS-J09, with the top part of the boring in the right portion of this photo. In this interval a PID response of 4.1 ppm was detected. The soil is described as: 20.0 - 21.5 ft.: SANDY SILT (ML); Gray; Wet; Soft (Sludge?). 21.5 - 25.0 ft.: NO RECOVERY.		





**OFFICIAL PHOTOGRAPH NO. 16**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J09	<b>Date:</b>	May 9, 2011
<b>Photo Number:</b>	DSCN0144	<b>Time:</b>	1549
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 25.0 - 26.0 ft. interval of soil boring SMS-J09, with the top part of the boring in the right portion of the photo. In this interval a PID response of 0.2 ppm was detected. The soil is described as: 25.0 - 26.0 ft.: SANDY SILT (ML); Gray; Wet; Soft (Sludge?). 26.0 ft.: Total depth (gray limestone in sampler).		





**OFFICIAL PHOTOGRAPH NO. 17**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J10	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0145	<b>Time:</b>	0659
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0-5.0 ft. interval of soil boring SMS-J10, with the top part of the boring in the right portion of the photo. In the 2.5 – 3.5 ft. interval, a PID response of 1.7 ppm was detected. The soil is described as: 0.0 - 2.5 ft.: SILTY CLAY (CL); Red; Dry; Hard; Low Plasticity (Cap) 2.5 - 3.5 ft.: CLAY (CH); Orange; Moist; Hard; Plastic; Some Cobble. 3.5 - 5.0 ft.: NO RECOVERY		





**OFFICIAL PHOTOGRAPH NO. 18**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J10	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0146	<b>Time:</b>	0709
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 - 10.0 ft. interval of soil boring SMS-J10, with the top part of the boring in the right portion of the photo. In the 5.0 - 6.5 ft. interval, a PID response of 1.4 ppm was detected. The soil is described as: 5.0 - 6.5 ft.: SILTY SAND (SM); Gray; Moist; Dense; Well Graded; Fine Grained; Sub-Angular; some Gravel 6.5 - 7.5 ft.: Limestone Cobbles 7.5 - 10.0 ft.: NO RECOVERY		





**OFFICIAL PHOTOGRAPH NO. 19**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J10	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0147	<b>Time:</b>	0720
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 - 15.0 ft. interval of soil boring SMS-J10, with the top part of the boring in the right portion of the photo. In this interval, a PID response was not detected. The soil is described as: 10.0 - 13.0 ft.: SILTY SAND (SM): Gray; Moist; Dense; With Red Limestone Cobbles. 13.0 - 14.0 ft.: SILTY SAND (SM): Gray grading to Orange; Wet; Medium Dense. 14.0 - 15.0 ft.: NO RECOVERY		





**OFFICIAL PHOTOGRAPH NO. 20**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J10	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0149	<b>Time:</b>	0737
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 15.0 - 20.0 ft. interval of soil boring SMS-J10, with the top part of the boring in the right portion of the photo. In this interval, a PID response was not detected. The soil is described as: 15.0 - 16.0 ft.: SILTY SAND (SM): Gray; Wet; Dense. 16.0 - 17.5 ft.: NO RECOVERY; very soft material 17.5 - 20.0 ft.: SILT (ML); Gray; Wet; Soft; Non-plastic; Organic odor (sludge?)		





**OFFICIAL PHOTOGRAPH NO. 21**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node J10	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0150	<b>Time:</b>	0748
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 20.0 - 24.0 ft. interval of soil boring SMS-J10, with the top part of the boring in the right portion of the photo. In this interval, a PID response was not detected. The soil is described as: 20.0 - 23.0 ft.: SILT (ML); Gray; Wet; Soft; Non-plastic; Organic odor (sludge?) 23.0 - 24.0 ft.: SILTY SAND (SM); Orange/Brown; Wet; Dense; Fine Grained; Sub-angular. 24.0 ft.: Total depth.		





**OFFICIAL PHOTOGRAPH NO. 22**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node I10	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0151	<b>Time:</b>	0831
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 - 5.0 ft. interval of soil boring SMS-I10, with the top part of the boring in the right portion of the photo. In the 3.0 to 5.0 ft. section, a PID response of 2.3 ppm was detected. The soil is described as: 0.0 - 3.0 ft.: SILTY CLAY (CL); Red; Dry; Hard; Low Plasticity (Cap) 3.0 - 5.0 ft.: SILTY SAND (SM); Gray; Wet; Medium Dense; Fine Grained; Poorly Graded; Sub-angular.		





**OFFICIAL PHOTOGRAPH NO. 23**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node I10	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0152	<b>Time:</b>	0843
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 - 10.0 ft. interval of soil boring SMS-I10, with the top part of the boring in the right portion of the photo. In the 5.0 to 8.5 ft. section, a PID response of 82.2 ppm was detected. The soil is described as: 5.0 - 8.5 ft.: SILTY SAND (SM); Gray; Wet; Medium Dense; Fine Grained; Poorly Graded; Sub-angular, some wood fragments. 8.5 - 10.0 ft.: NO RECOVERY		





**OFFICIAL PHOTOGRAPH NO. 24**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node I10	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0153	<b>Time:</b>	0907
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 - 15.0 ft. interval of soil boring SMS-I10, with the top part of the boring in the right portion of the photo. In this interval a PID response of 32.0 ppm was detected. The soil is described as: 10.0 - 11.0 ft.: SANDY SILT (ML); Dark Gray; Wet; Stiff; Non-Plastic; Cohesive 11.0 - 15.0 ft.: NO RECOVERY		





**OFFICIAL PHOTOGRAPH NO. 25**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node I10	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0154	<b>Time:</b>	0914
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 15.0 - 20.0 ft. interval of soil boring SMS-I10 with the top part of the boring in the right portion of the photo. In this interval a PID response of 0.6 ppm was detected. The soil is described as: 15.0 – 20.0 ft.: CLAY (CH); Orange; Wet; Soft; Plastic.		





**OFFICIAL PHOTOGRAPH NO. 26**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node I10	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0155	<b>Time:</b>	0925
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 20.0 - 25.0 ft. interval of soil boring SMS-I10 with the top part of the boring in the right portion of the photo. In this interval a PID response of 0.6 ppm was detected. The soil is described as: 20.0 – 22.0 ft.: CLAY (CH); Orange; Wet; Soft; Plastic. 22.0 - 25.0 ft.: SILTY CLAY (CH); Gray Mottled; Wet; Stiff; Plastic		





**OFFICIAL PHOTOGRAPH NO. 27**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node I10	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0156	<b>Time:</b>	0943
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 25.0 - 29.0 ft. interval of soil boring SMS-I10 with the top part of the boring in the right portion of the photo. In this interval a PID response of 0.2 ppm was detected. The soil is described as: 25.0 – 26.5 ft.: SILTY CLAY (CH); Gray Mottled; Wet; Stiff; Plastic. 26.5 - 29.0 ft.: NO RECOVERY. 29.0 ft.: Total depth.		





**OFFICIAL PHOTOGRAPH NO. 28**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node I9	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0157	<b>Time:</b>	1021
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 - 5.0 ft. interval of soil boring SMS-I9 with the top part of the boring in the right portion of the photo. In the 2.0 - 5.0 ft. section, a PID response of 0.8 ppm was detected. The soil is described as: 0.0 - 2.0 ft.: SILTY CLAY (CL); Red; Dry; Hard; Low Plasticity (Cap). 2.0 - 5.0 ft.: SILTY SAND (SM); Gray; Wet; Dense; Fine Grained; Well Graded; Some Gravel.		





**OFFICIAL PHOTOGRAPH NO. 29**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node I9	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0158	<b>Time:</b>	1038
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 - 10.0 ft. interval of soil boring SMS-I9 with the top part of the boring in the right portion of the photo. In the 5.0 - 6.0 ft. section, a PID response of 1.4 ppm was detected. The soil is described as: 5.0 - 6.0 ft.: SILTY SAND (SM); Gray; Wet; Dense; Fine Grained; Well Graded; Some Gravel. 6.0 - 8.0 ft.: CLAY (CH); Orange; Moist; Hard; Plastic 8.0 - 9.0 ft.: SILTY SAND (SM); Gray; Wet; Loose to Medium Dense; Fine Grained; Poorly Graded 9.0 - 10.0 ft.: SILTY CLAY (CL); Gray to Orange; Moist; Hard; Non-Plastic		





**OFFICIAL PHOTOGRAPH NO. 30**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Former Settling Ponds, Center of Node I9      **Date:** May 10, 2011

**Photo Number:** DSCN0159      **Time:** 1058

**Orientation:** -

**Photographer:** Andrew Grimmke, JMWA

**Subject:** The 10.0 - 15.0 ft. interval of soil boring SMS-I9 with the top part of the boring in the right portion of the photo. In the 5.0 – 14.5 ft. section, a PID response of 217 ppm was detected. The soil is described as:  
10.0 – 14.5 ft.: SILTY CLAY (CL); Gray to Orange; Wet; Hard; Non-Plastic, Grading Sandy Oil Sheen and Odor at 13.5 ft. (also cloth material)  
14.5 - 15.0 ft.: CLAY (CH); Orange; Wet; Soft; Plastic





**OFFICIAL PHOTOGRAPH NO. 31**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former Settling Ponds, Center of Node I9	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0160	<b>Time:</b>	1110
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 15.0 - 20.0 ft. interval of soil boring SMS-I9 with the top part of the boring in the right portion of the photo. In the 15.0 – 17.5 ft. section, a PID response of 0.8 ppm was detected. The soil is described as: 15.0 - 17.5 ft.: CLAY (CH); Orange; Wet; Soft; Plastic 17.5 - 20.0 ft.: NO RECOVERY		





**OFFICIAL PHOTOGRAPH NO. 32**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Former Settling Ponds, Center of Node I9      **Date:** May 10, 2011

**Photo Number:** DSCN0161      **Time:** 1119

**Orientation:** -

**Photographer:** Andrew Grimmke, JMWA

**Subject:** The 20.0 - 25.0 ft. interval of soil boring SMS-I9 with the top part of the boring in the right portion of the photo. In the 20.0 ft. section, a PID response of 0.9 ppm was detected. The soil is described as:  
20.0 – 23.5 ft.: CLAY (CH); Orange; Wet; Soft; Plastic  
23.5 - 25.0 ft.: NO RECOVERY;  
25.0 ft.: Total depth.





**OFFICIAL PHOTOGRAPH NO. 33**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former settling ponds, between Nodes J10 and J11	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0162	<b>Time:</b>	1152
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 - 5.0 ft. interval of soil boring SMS-J10/11, with the top part of the boring in the right portion of the photo. In the 3.0 ft. section, a PID response of 0.2 ppm was detected. The soil is described as: 0.0 - 1.0 ft.: SILTY CLAY (CL); Red; Dry; Hard; Low Plasticity (Cap) 1.0 - 3.5 ft.: SANDY CLAY (CL); Gray; Moist; Hard; Non-Plastic; Some Gravel and Asphalt 3.5 - 5.0 ft.: NO RECOVERY		





**OFFICIAL PHOTOGRAPH NO. 34**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Former settling ponds, between Nodes J10 and J11

**Date:** May10, 2011

**Photo Number:** DSCN0163

**Time:** 1206

**Orientation:** -

**Photographer:** Andrew Grimmke, JMWA

**Subject:** The 5.0 - 10.0 ft. interval of soil boring SMS-J10/11, with the top part of the boring in the right portion of the photo. In the 5.0 ft. section, a PID response of 1.1 ppm was detected. The soil is described as:  
5.0 - 5.5 ft.: Same as 1.0 - 3.5' above except with blue/tan sandy waste material  
5.5 - 8.0 ft.: SILTY CLAY (CH); Gray/Brown; Wet; Soft; Plastic  
8.0 - 10.0 ft.: SILTY SAND (SM); Gray; Wet; Medium Dense; Fine Grained; Poorly Graded; Sub-rounded





**OFFICIAL PHOTOGRAPH NO. 35**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former settling ponds, between Nodes J10 and J11	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0164	<b>Time:</b>	1214
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 - 15.0 ft. interval of soil boring SMS-J10/11, with the top part of the boring in the right portion of the photo. In this interval, a PID response was not detected. The soil is described as: 10.0 - 11.0 ft.: SILTY SAND (SM); Gray; Wet; Medium Dense; Fine Grained; Poorly Graded; Sub-rounded. 11.0 - 15.0 ft.: SLUDGE; Light Gray; Very Soft; Non-plastic.		





**OFFICIAL PHOTOGRAPH NO. 36**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former settling ponds, between Nodes J10 and J11	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0165	<b>Time:</b>	1229
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 15.0 - 20.0 ft. interval of soil boring SMS-J10/11, with the top part of the boring in the right portion of the photo. In this interval, a PID response was not detected. The soil is described as: 15.0 - 20.0 ft.: CLAY (CH); Orange; Wet; Stiff; Plastic. 20.0 ft.: Total depth.		





**OFFICIAL PHOTOGRAPH NO. 37**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former settling ponds, between of Nodes J8 and K8	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0166	<b>Time:</b>	1354
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 - 5.0 ft. interval of soil boring SMS-K8, with the top part of the boring in the right portion of the photo. In the 4.0 ft. section, a PID response of 0.1 ppm was detected. The soil is described as: 0.0 - 3.0 ft.: SILTY CLAY (CL); Red; Dry; Hard; Low Plasticity (Cap) 3.0 - 5.0 ft.: SILTY SAND (SM); Gray; Moist; Medium Dense; Fine Grained; Poorly Graded; Sub-angular		





**OFFICIAL PHOTOGRAPH NO. 38**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former settling ponds, between of Nodes J8 and K8	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0167	<b>Time:</b>	1405
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 - 10.0 ft. interval of soil boring SMS-K8, with the top part of the boring in the right portion of the photo. In the 5.0 ft. section, a PID response of 0.1 ppm was detected. The soil is described as: 5.0 - 6.0 ft.: SILTY SAND (SM); Gray; Moist; Medium Dense; Fine Grained; Poorly Graded; Sub-angular 6.0 - 10.0 ft.: NO RECOVERY		





**OFFICIAL PHOTOGRAPH NO. 39**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former settling ponds, between of Nodes J8 and K8	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0168	<b>Time:</b>	1417
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 - 15.0 ft. interval of soil boring SMS-K8, with the top part of the boring in the right portion of the photo. In the 10.0 ft. section, a PID response of 2.2 ppm was detected. The soil is described as: 10.0 - 13.0 ft.: SILTY CLAY (CL); Orange/Gray; Moist; Hard; Non-plastic; Some Sand and Gravel 13.0 - 15.0 ft.: SILTY CLAY (CL); Gray; Wet; Soft		





**OFFICIAL PHOTOGRAPH NO. 40**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former settling ponds, between of Nodes J8 and K8	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0169	<b>Time:</b>	1425
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 15.0 - 20.0 ft. interval of soil boring SMS-K8, with the top part of the boring in the right portion of the photo. In the 15.0 ft. section, a PID response of 1.4 ppm was detected. The soil is described as: 15.0 - 16.5 ft.: SILTY CLAY (CL); Gray; Wet; Soft, with wood. 16.5 - 18.5 ft.: CLAY (CH); Orange; Wet; Firm; Plastic 18.5 - 20.0 ft.: NO RECOVERY		





**OFFICIAL PHOTOGRAPH NO. 41**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former settling ponds, between of Nodes J8 and K8	<b>Date:</b>	May 10, 2011
<b>Photo Number:</b>	DSCN0170	<b>Time:</b>	1437
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 20.0 - 25.0 ft. interval of soil boring SMS-K8, with the top part of the boring in the right portion of the photo. In this interval, a PID response was not detected. The soil is described as: 20.0 – 25.0 ft.: CLAY (CH); Orange; Wet; Firm; Plastic. Note: No photo taken of 25.0 to 29.0, but it is described as the same as 20.0 to 25.0 ft. 29.0 ft.: Total Depth.		





**OFFICIAL PHOTOGRAPH NO. 42**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, within Node J7	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0171	<b>Time:</b>	0636
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 - 5.0 ft. interval of soil boring SMS-J7, with the top part of the boring in the right portion of the photo. In the 3.0 ft. section, a PID response of 0.3 ppm was detected. The soil is described as: 0.0 - 2.5 ft.: SILTY CLAY (CL); Red; Dry; Hard; Low Plasticity (Cap) 2.5 - 5.0 ft.: SILTY SAND (SM); Gray; Wet; Dense; Well Graded; Fine Grained; Some Gravel		





**OFFICIAL PHOTOGRAPH NO. 43**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, within Node J7	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0172	<b>Time:</b>	0646
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 - 10.0 ft. interval of soil boring SMS-J7, with the top part of the boring in the right portion of the photo. In the 5.0 ft. section, a PID response of 3.2 ppm was detected. The soil is described as: 5.5 - 6.0 ft.: SILTY SAND (SM); Gray; Wet; Dense; Well Graded; Fine Grained; Some Gravel 6.0 - 9.0 ft.: SILTY CLAY (CL); Dark Gray; Moist; Hard; Non-plastic; some cobbles, wood fibers, possible fuel odor. 9.0 - 10.0 ft.: SILTY CLAY (CH); Orange; Moist; Stiff; Plastic.		





**OFFICIAL PHOTOGRAPH NO. 44**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, within Node J7	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0173	<b>Time:</b>	0700
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 - 15.0 ft. interval of soil boring SMS-J7, with the top part of the boring in the right portion of the photo. In the 10.0 ft. section, a PID response of 1.0 ppm was detected. The soil is described as: 10.0 – 15.0 ft.: SILTY CLAY (CH); Grading Brown to Orange; Moist; Stiff; Plastic.		





**OFFICIAL PHOTOGRAPH NO. 45**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, within Node J7	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0174	<b>Time:</b>	0708
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 15.0 - 20.0 ft. interval of soil boring SMS-J7, with the top part of the boring in the right portion of the photo. In the 15.0 ft. section, a PID response of 0.3 ppm was detected. The soil is described as: 15.0 – 20.0 ft.: SILTY CLAY (CH); Grading Brown to Orange; Moist; Stiff; Plastic.		





**OFFICIAL PHOTOGRAPH NO. 46**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, within Node J7	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0175	<b>Time:</b>	0717
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 20.0 - 25.0 ft. interval of soil boring SMS-J7, with the top part of the boring in the right portion of the photo. In this interval, a PID response was not detected. The soil is described as: 20.0 – 25.0 ft.: SILTY CLAY (CH); Grading Brown to Orange; Moist; Stiff; Plastic.		





**OFFICIAL PHOTOGRAPH NO. 47**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Former UST Area, within Node J7

**Date:** May 11, 2011

**Photo Number:** DSCN0176

**Time:** 0728

**Orientation:** -

**Photographer:** Andrew Grimmke, JMWA

**Subject:** The 25.0 – 29.5 ft. interval of soil boring SMS-J7, with the top part of the boring in the right portion of the photo. In this interval, a PID response was not detected. The soil is described as:  
25.0 – 29.5 ft.: SILTY CLAY (CH); Grading Brown to Orange; Moist; Stiff; Plastic.  
29.5 ft.: Total Depth.





**OFFICIAL PHOTOGRAPH NO. 48**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, between of Nodes J7 and J8, South of former UST	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0177	<b>Time:</b>	0812
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 – 5.0 ft. interval of soil boring SMS-J7S, with the top part of the boring in the right portion of the photo. In the 3.0 ft. section, a PID response of 0.8 ppm was detected. The soil is described as: 0.0 - 2.5 ft.: SILTY CLAY (CL); Red; Dry; Hard; Low Plasticity (Cap) 2.5 - 5.0 ft.: SILTY SAND (SM); Gray; Moist; Medium Dense; Fine Grained; Well Graded; Some Gravel		





**OFFICIAL PHOTOGRAPH NO. 49**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, between of Nodes J7 and J8, South of former UST	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0178	<b>Time:</b>	0815
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 – 10.0 ft. interval of soil boring SMS-J7S, with the top part of the boring in the right portion of the photo. In the 5.0 ft. section, a PID response of 1.3 ppm was detected. The soil is described as: 5.0 - 10.0 ft.: SILTY SANDY CLAY (CL); Gray to Black; Wet; Hard; Low Plasticity; Layers of Organic Material; Some Cobbles		





**OFFICIAL PHOTOGRAPH NO. 50**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, between of Nodes J7 and J8, South of former UST	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0179	<b>Time:</b>	0822
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 – 15.0 ft. interval of soil boring SMS-J7S, with the top part of the boring in the right portion of the photo. In the 10.0 ft. section, a PID response of 0.5 ppm was detected. The soil is described as: 10.0 - 15.0 ft.: SILTY SANDY CLAY (CL); Gray to Black; Wet; Hard; Low Plasticity; Layers of Organic Material; Some Cobbles 13.0 - 15.0 ft.: SILTY CLAY (CH); Orange; Moist; Hard; Plastic; (Native) 15.0 ft.: Total depth.		





**OFFICIAL PHOTOGRAPH NO. 51**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, between Nodes J7 and K7, East of former UST	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0180	<b>Time:</b>	0841
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 – 5.0 ft. interval of soil boring SMS-J7E, with the top part of the boring in the right portion of the photo. In the 2.0 ft. section, a PID response of 1.0 ppm was detected. The soil is described as: 0.0 - 2.0 ft.: SILTY CLAY (CL); Red; Dry; Hard; Low Plasticity (Cap) 2.0 - 3.0 ft.: SANDY CLAY (CL); Brown; Wet; Stiff; Low Plasticity 3.0 - 5.0 ft.: NO RECOVERY		





**OFFICIAL PHOTOGRAPH NO. 52**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, between Nodes J7 and K7, East of former UST	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0181	<b>Time:</b>	0848
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 – 10.0 ft. interval of soil boring SMS-J7E, with the top part of the boring in the right portion of the photo. In the 5.0 ft. section, a PID response of 0.6 ppm was detected. The soil is described as: 5.0 - 7.5 ft.: Same as 2.0 - 3.0' above except Grading Orange/Brown, Wet, Soft 7.5 - 10.0 ft.: NO RECOVERY		





**OFFICIAL PHOTOGRAPH NO. 53**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, between Nodes J7 and K7, East of former UST	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0182	<b>Time:</b>	0852
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 – 15.0 ft. interval of soil boring SMS-J7E, with the top part of the boring in the right portion of the photo. In the 10.0 ft. section, a PID response of 5.2 ppm was detected. The soil is described as: 10.0 - 15.0 ft.: CLAY (CH); Orange; Moist; Soft; Plastic (Native) 15.0 ft.: Total Depth.		





**OFFICIAL PHOTOGRAPH NO. 54**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, within Node J7, North of former UST	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0183	<b>Time:</b>	0904
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 – 5.0 ft. interval of soil boring SMS-J7N, with the top part of the boring in the right portion of the photo. In the 4.0 ft. section, a PID response of 0.9 ppm was detected. The soil is described as: 0.0 - 3.0 ft.: SILTY CLAY (CL); Red; Dry; Hard; Low Plasticity (Cap) 3.0 - 5.0 ft.: SILTY CLAYEY SAND (SM/SC); Gray; Wet; Medium, Dense, Fine Grained; Well Graded; Some Gravel.		





**OFFICIAL PHOTOGRAPH NO. 55**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, within Node J7, North of former UST	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0184	<b>Time:</b>	0907
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 – 10.0 ft. interval of soil boring SMS-J7N, with the top part of the boring in the right portion of the photo. In the 5.0 ft. section, a PID response of 2.1 ppm was detected. The soil is described as: 5.0 - 7.0 ft.: SANDY CLAY (CL); Brown; Moist; Stiff; Non-plastic; clear, plastic bag material encountered.		





**OFFICIAL PHOTOGRAPH NO. 56**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, within Node J7, North of former UST	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0185	<b>Time:</b>	0914
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 – 15.0 ft. interval of soil boring SMS-J7N, with the top part of the boring in the right portion of the photo. In the 10.0 ft. section, a PID response of 1.8 ppm was detected. The soil is described as: 10.0 - 15.0 ft.: CLAY (CH); Orange; Moist; Stiff; Plastic (Native). 15.0 ft.: Total depth.		





**OFFICIAL PHOTOGRAPH NO. 57**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, within Node J7, West of former UST	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0186	<b>Time:</b>	0926
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 – 5.0 ft. interval of soil boring SMS-J7W, with the top part of the boring in the right portion of the photo. In the 3.0 ft. section, a PID response of 0.1 ppm was detected. The soil is described as: 0.0 - 3.0 ft.: SILTY CLAY (CL); Red; Dry; Hard; Low Plasticity (Cap) 3.0 - 5.0 ft.: SILTY SAND (SM); Gray; Wet; Dense; Fine Grained; Sub-angular; Well Graded; Some Cobbles.		





**OFFICIAL PHOTOGRAPH NO. 58**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, within Node J7, West of former UST	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0187	<b>Time:</b>	0938
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 – 10.0 ft. interval of soil boring SMS-J7W, with the top part of the boring in the right portion of the photo. In the 5.0 ft. section, a PID response of 0.3 ppm was detected. The soil is described as: 5.0 - 10.0 ft.: CLAY (CH); Orange; Moist; Stiff; Plastic.		





**OFFICIAL PHOTOGRAPH NO. 59**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former UST Area, within Node J7, West of former UST	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0188	<b>Time:</b>	0946
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 – 15.0 ft. interval of soil boring SMS-J7W, with the top part of the boring in the right portion of the photo. No PID response was detected from this section. The soil is described as: 10.0 - 15.0 ft.: CLAY (CH); Orange; Moist; Stiff; Plastic. 15.0 ft.: Total depth.		





**OFFICIAL PHOTOGRAPH NO. 60**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, South of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0189	<b>Time:</b>	1052
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 – 5.0 ft. interval of soil boring SMS-L4S1 (J7W written on board is from previous location), with the top part of the boring in the right portion of the photo. No PID response was detected from this section. The soil is described as: 0.0 - 2.0 ft.: SILTY CLAY (CL); Red; Dry; Hard; Low Plasticity 2.0 - 5.0 ft.: NO RECOVERY.		





**OFFICIAL PHOTOGRAPH NO. 61**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, South of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0190	<b>Time:</b>	1059
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 – 10.0 ft. interval of soil boring SMS-L4S1 (J7W written on board is from previous location), with the top part of the boring in the right portion of the photo. No PID response was detected from this section. The soil is described as: 5.0 - 10.0 ft.: SILTY CLAY (CL); Red grading orange; Dry; Hard; Low Plasticity.		





**OFFICIAL PHOTOGRAPH NO. 62**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, South of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0191	<b>Time:</b>	1105
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 – 15.0 ft. interval of soil boring SMS-L4S1 (J7W written on board is from previous location), with the top part of the boring in the right portion of the photo. In the 10.0 ft. section, a PID response of 0.6 ppm was detected. The soil is described as: 10.0 - 15.0 ft.: SILTY CLAY (CL); Red grading orange; Dry; Hard; Low Plasticity.		





**OFFICIAL PHOTOGRAPH NO. 63**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, South of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0192	<b>Time:</b>	1114
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 15.0 – 20.0 ft. interval of soil boring SMS-L4S1 (J7W written on board is from previous location), with the top part of the boring in the right portion of the photo. In the 15.0 ft. section, a PID response of 2.3 ppm was detected. The soil is described as: 15.0 - 20.0 ft.: SILTY CLAY (CL); Red grading orange; Dry; Stiff; Low Plasticity.		





**OFFICIAL PHOTOGRAPH NO. 64**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, South of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0193	<b>Time:</b>	1123
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 20.0 – 25.0 ft. interval of soil boring SMS- L4S1, with the top part of the boring in the right portion of the photo. In the 20.0 ft. section, a PID response of 0.3 ppm was detected. The soil is described as: 20.0 - 25.0 ft.: SILTY CLAY (CL); Red grading orange; Dry; Stiff; Low Plasticity.		





**OFFICIAL PHOTOGRAPH NO. 65**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, South of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0195	<b>Time:</b>	1128
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 25.0 – 27.0 ft. interval of soil boring SMS-L4S1, with the top part of the boring in the right portion of the photo. In the 25.0 ft. section, a PID response of 0.2 ppm was detected. The soil is described as: 25.0 - 27.0 ft.: SILTY CLAY (CL); Red grading orange; Dry; Stiff; Low Plasticity. 27.0 ft.: Total depth.		





**OFFICIAL PHOTOGRAPH NO. 66**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, South of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0196	<b>Time:</b>	1154
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 – 5.0 ft. interval of soil boring SMS-L4S2, with the top part of the boring in the right portion of the photo. In the 0.0 ft. section, a PID response of 0.1 ppm was detected. The soil is described as: 0.0 - 4.0 ft.: CLAY (CH); Orange; Stiff; Moist; Plastic 4.0 - 5.0 ft.: NO RECOVERY. Soil sample collected (0.0 – 5.0 ft.).		





**OFFICIAL PHOTOGRAPH NO. 67**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, South of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0197	<b>Time:</b>	1200
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 – 10.0 ft. interval of soil boring SMS-L4S2, with the top part of the boring in the right portion of the photo. In the 5.0 ft. section, a PID response of .0.5 ppm was detected. The soil is described as: 5.0 - 10.0 ft.: CLAY (CH); Orange; Hard; Moist; Plastic.		





**OFFICIAL PHOTOGRAPH NO. 68**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, South of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0198	<b>Time:</b>	1206
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 – 15.0 ft. interval of soil boring SMS-L4S2, with the top part of the boring in the right portion of the photo. In the 10.0 ft. section, a PID response of 11.2 ppm was detected. The soil is described as: 10.0 – 13.5 ft.: CLAY (CH); Orange; Hard; Moist; Plastic 13.5 - 15.0 ft.: CLAY (CL); Gray; Wet; Soft Note: The next photo in sequence to this boring location is Photograph No. 75.		





**OFFICIAL PHOTOGRAPH NO. 69**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, East side of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0199	<b>Time:</b>	1217
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 – 5.0 ft. interval of soil boring SMS-L4E, with the top part of the boring in the right portion of the photo. In the 0.0 ft. section, a PID response of 0.2 ppm was detected. The soil is described as: 0.0 – 5.0 ft.: CLAY (CL); Orange; Dry; Hard; Low Plasticity Soil sample collected (0.0 – 5.0 ft.).		





**OFFICIAL PHOTOGRAPH NO. 70**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, East side of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0200	<b>Time:</b>	1219
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 – 10.0 ft. interval of soil boring SMS-L4E, with the top part of the boring in the right portion of the photo. In the 5.0 ft. section, a PID response of 0.4 ppm was detected. The soil is described as: 5.0 – 10.0 ft.: CLAY (CL); Orange; Moist; Hard; Low Plasticity		





**OFFICIAL PHOTOGRAPH NO. 71**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, East side of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0201	<b>Time:</b>	1229
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 – 15.0 ft. interval of soil boring SMS-L4E, with the top part of the boring in the right portion of the photo. In the 10.0 ft. section, a PID response of 0.6 ppm was detected. The soil is described as: 10.0 – 15.0 ft.: CLAY (CL); Orange; Moist; Hard; Low Plasticity 15.0 ft.: Total depth.		





**OFFICIAL PHOTOGRAPH NO. 72**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, North side of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0202	<b>Time:</b>	1250
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 0.0 – 5.0 ft. interval of soil boring SMS-L4N, with the top part of the boring in the right portion of the photo. No PID response was detected from this section. The soil is described as: 0.0 - 2.0 ft.: SANDY CLAY (CH); Brown/Orange; Wet; Stiff; Plastic 2.0 - 5.0 ft.: NO RECOVERY Soil sample collected (0.0 – 5.0 ft.).		





**OFFICIAL PHOTOGRAPH NO. 73**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, North side of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0203	<b>Time:</b>	1256
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 5.0 – 10.0 ft. interval of soil boring SMS-L4N, with the top part of the boring in the right portion of the photo. In the 5.0 ft. section, a PID response of 0.1 ppm was detected. The soil is described as: 5.0 - 10.0 ft.: CLAY (CH); Orange; Moist; Hard; Plastic		





**OFFICIAL PHOTOGRAPH NO. 74**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, North side of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0204	<b>Time:</b>	1304
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 10.0 – 15.0 ft. interval of soil boring SMS-L4N, with the top part of the boring in the right portion of the photo. In the 10.0 ft. section, a PID response of 0.1 ppm was detected. The soil is described as: 10.0 - 15.0 ft.: CLAY (CH); Orange; Moist; Hard; Plastic 15.0 ft.: Total depth.		





**OFFICIAL PHOTOGRAPH NO. 75**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Former transformer area, node L4, South of Platform	<b>Date:</b>	May 11, 2011
<b>Photo Number:</b>	DSCN0205	<b>Time:</b>	1324
<b>Orientation:</b>	-		
<b>Photographer:</b>	Andrew Grimmke, JMWA		
<b>Subject:</b>	The 15.0 – 20.0 ft. interval of soil boring SMS-L4S2, with the top part of the boring in the right portion of the photo. In the 15.0 ft. section, a PID response of 17.5 ppm was detected. The soil is described as: 15.0 - 20.0 ft.: SANDY CLAY (CL); Light Brown, Wet, Soft, Some Cobbles. 20.0 ft.: Total depth. Note: The photo previous to this boring location is Photograph No. 68.		



**J.M. Waller Associates, Inc.**

**Remedial Action Contract II Lite, Region IV, Photo Log**

<b>Contract:</b>	EP-S4-08-03	<b>Site Name:</b>	Smokey Mountain Smelters
<b>Task No.:</b>	019	<b>Date:</b>	May 2011
<b>RPM:</b>	Rusty Kestle	<b>Project Mgt.:</b>	Janice Austin
<b>PHOTO LOG</b>			

During the week of May 2, 2011 J. M. Waller, Inc., conducted surface water/ sediment sampling (including a streamlined geomorphic assessment and vegetative survey), benthic macroinvertebrate survey, and fish collection within East Flenniken Branch, Flenniken Branch, and Knob Creek Embayment. The following photographs show the various activities as they occurred in order of date.

**ACKNOWLEDGEMENTS**

<b>SIGNATURE</b>	<b>Date:</b>	<b>PM SIGNATURE</b>	<b>Date:</b>
------------------	--------------	---------------------	--------------





**OFFICIAL PHOTOGRAPH NO.: 1**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** SMSSDSW01 – Flenniken Branch

**Date:** May 2, 2011

**Photo Number:** 030

**Time:** 1110

**Orientation:** Southeast

**Photographer:** Tod DeLong, Avatar Environmental

**Subject:** Sample location, SMSSDSW01 is a background location. Larry Everett, Biologist, Tennessee Department of Environment and Conservation conducts the macroinvertebrate survey within Flenniken Branch.





**OFFICIAL PHOTOGRAPH NO.: 2**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** SMSSDSW01 – Flenniken Branch

**Date:** May 2, 2011

**Photo Number:** 031

**Time:** 1114

**Orientation:** Southeast

**Photographer:** Tod DeLong, Avatar Environmental

**Subject:** Sample location, SMSSDSW01 is a background location. Larry Everett, Biologist, Tennessee Department of Environment and Conservation conducts the macroinvertebrate survey within Flenniken Branch.





**OFFICIAL PHOTOGRAPH NO.: 3**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** SMSSDSW01 – Flenniken Branch

**Date:** May 2, 2011

**Photo Number:** 032

**Time:** 1135

**Orientation:** South

**Photographer:** Tod DeLong, Avatar Environmental

**Subject:** Sample location, SMSSDSW01 is a background location. Larry Everett, Biologist, Tennessee Department of Environment and Conservation conducts the macroinvertebrate survey within Flenniken Branch.





**OFFICIAL PHOTOGRAPH NO.: 4**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** SMSSDSW01 – Flenniken Branch

**Date:** May 2, 2011

**Photo Number:** 033

**Time:** 1135

**Orientation:** South

**Photographer:** Tod DeLong, Avatar Environmental

**Subject:** Sample location, SMSSDSW01 is a background location. Larry Everett, Biologist and Brooke Childrey, Intern both of the Tennessee Department of Environment and Conservation conducts the macroinvertebrate survey within Flenniken Branch.





**OFFICIAL PHOTOGRAPH NO. 5**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW03 -	<b>Date:</b>	May 2, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1330
<b>Orientation:</b>	East		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Tod DeLong, Avatar Environmental and C.J. Roebuck, JMWA at SMSSDSW03 on Flenniken Branch.		





**OFFICIAL PHOTOGRAPH NO. 6**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** SMSSDSW03

**Date:** May 2, 2011

**Photo Number:** NA

**Time:** 1330

**Orientation:** West

**Photographer:** Jack Kuiper, JMWA

**Subject:** Larry Everett, Biologist and Brooke Childrey, Intern both of the Tennessee Department of Environment and Conservation check the suitability of this location to conduct the macroinvertebrate survey within Flenniken Branch. It was determined this location was not suitable for benthic samples.

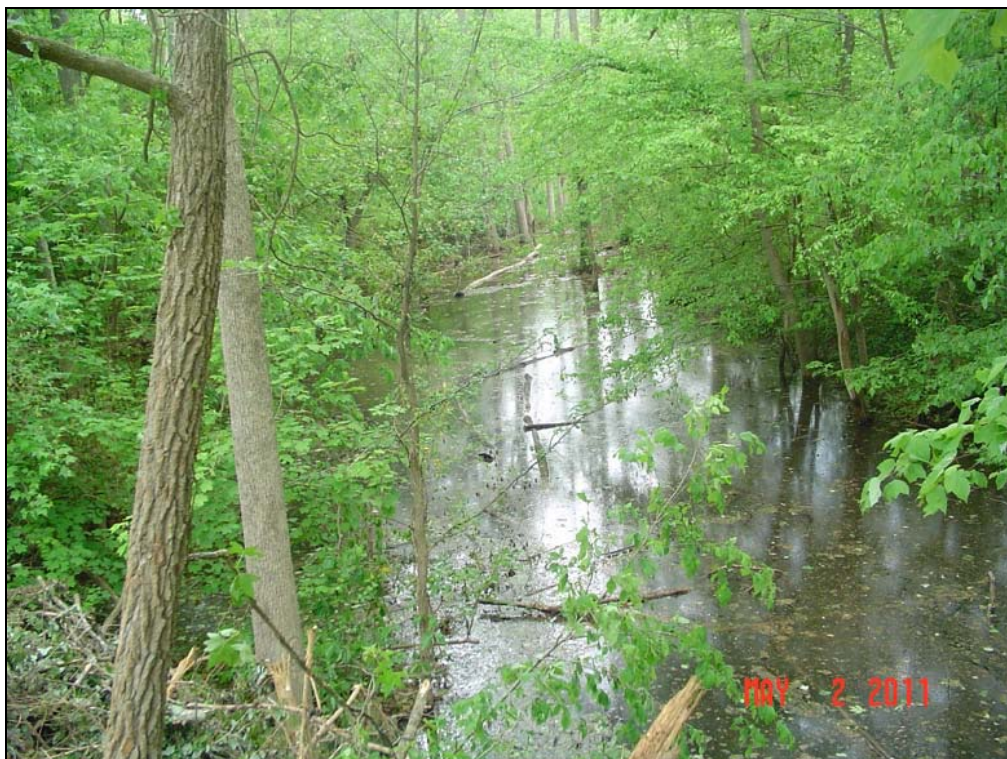




**OFFICIAL PHOTOGRAPH NO. 7**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW04	<b>Date:</b>	May 2, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1430
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Wetland west of proposed sample location SMSSDSW04 on Flenniken Branch. It was determined to move SMSSDSW04 downstream near the Witherspoon property.		





**OFFICIAL PHOTOGRAPH NO. 8**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW04	<b>Date:</b>	May 2, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1430
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Wetland west of proposed sample location SMSSDSW04 on Flenniken Branch. It was determined to move SMSSDSW04 downstream near the Witherspoon property.		





**OFFICIAL PHOTOGRAPH NO.: 9**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW06	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1000
<b>Orientation:</b>	Northeast		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Flenniken Branch, upstream of SMSSDSW06 sample location.		





**OFFICIAL PHOTOGRAPH NO.: 10**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW06	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1000
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Wetland Area 1 on Flenniken Branch north of SMSSDSW06 sample location. In background a small island near sample location with wetland plants such as cattails, spike rush, mint, water shamrock and other grasses.		





**OFFICIAL PHOTOGRAPH NO.: 11**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW06	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1000
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Wetland Area 1 on Flenniken Branch north of SMSSDSW06 sample location. In background a small island near sample location with wetland plants such as spike rush, mint, water shamrock and other grasses.		



**J.M. Waller Associates, Inc.**  
**RAC II Lite, Region IV, Photo Log**



**OFFICIAL PHOTOGRAPH NO.: 12**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW06	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1000
<b>Orientation:</b>	Northeast		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Tod DeLong, Avatar Environmental and C.J. Roebuck, JMWA at SMSSDSW06 on Flenniken Branch and Wetland Area 1.		

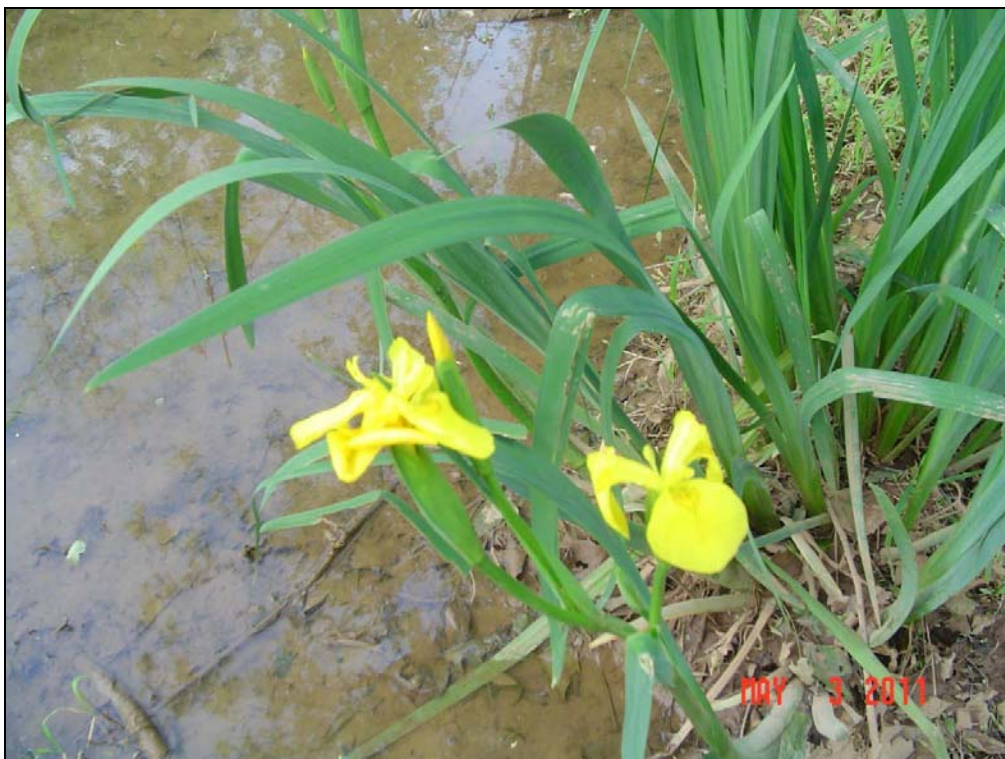




**OFFICIAL PHOTOGRAPH NO.: 13**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW06	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1000
<b>Orientation:</b>	Northeast		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Tod DeLong, Avatar Environmental and C.J. Roebuck, JMWA at SMSSDSW06 on Flenniken Branch and Wetland Area 1.		





**OFFICIAL PHOTOGRAPH NO.: 14**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW06	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1000
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Wetland plant Yellow Flag in Wetland Area 1 on Flenniken Branch near SMSSDSW06 sample location.		





**OFFICIAL PHOTOGRAPH NO.: 15**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW06	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1000
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Wetland Area 1 on Flenniken Branch near SMSSDSW06 sample location. Example of observed wetland plants.		





**OFFICIAL PHOTOGRAPH NO.: 16**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW06	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1000
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Wetland Area 1 on Flenniken Branch near SMSSDSW06 sample location. Example of observed wetland plants.		





**OFFICIAL PHOTOGRAPH NO.: 17**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW06	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1000
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Wetland Area 1 on Flenniken Branch near SMSSDSW06 sample location. Example of observed wetland plants such as Red Maple, Box Elder, Willow and Sycamore trees.		



**J.M. Waller Associates, Inc.**  
**RAC II Lite, Region IV, Photo Log**



**OFFICIAL PHOTOGRAPH NO.: 18**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW06	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1000
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Wetland plant Yellow Flag in Wetland Area 1 on Flenniken Branch near SMSSDSW06 sample location.		





**OFFICIAL PHOTOGRAPH NO.: 19**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW06	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1000
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Wetland plant Yellow Flag in Wetland Area 1 on Flenniken Branch near SMSSDSW06 sample location.		





**OFFICIAL PHOTOGRAPH NO.: 20**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW06	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1000
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Tod DeLong, Avatar Environmental and C.J. Roebuck, JMWA at SMSSDSW06 on Flenniken Branch and Wetland Area 1.		





**OFFICIAL PHOTOGRAPH NO.: 21**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW09	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1200
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Upstream from sampling location SMSSDSW09 on Flenniken Branch. Evidence of actively eroding bank.		





**OFFICIAL PHOTOGRAPH NO.: 22**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW09	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1200
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Near sampling location SMSSDSW09 and SMSSW09-Spring on Flenniken Branch.		



**J.M. Waller Associates, Inc.**  
**RAC II Lite, Region IV, Photo Log**



**OFFICIAL PHOTOGRAPH NO.: 23**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW09	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1200
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Avatar Environmental prepare to collect water quality readings at sampling location SMSSDSW09 on Flenniken Branch.		





**OFFICIAL PHOTOGRAPH NO.: 24**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW09	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1200
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Stream bank erosion near sampling location SMSSDSW09 on Flenniken Branch.		





**OFFICIAL PHOTOGRAPH NO.: 25**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW09	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1200
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Examples of observed vegetation, such as Sycamores, Tulip Popluars, Red Maple, Virginia Pine and Box Elders, near SMSSDSW09 on Flenniken Branch.		





**OFFICIAL PHOTOGRAPH NO.: 26**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW09	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1200
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Example of observed Honeysuckle Shrub near SMSSDSW09 on Flenniken Branch		





**OFFICIAL PHOTOGRAPH NO.: 27**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW09	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1200
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Preparing to collect samples at SMSSW09-Spring near Flenniken Branch.		





**OFFICIAL PHOTOGRAPH NO.: 28**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW08	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1300
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Overview near sample location SMSSDSW08 on Flenniken Branch.		



**J.M. Waller Associates, Inc.**  
**RAC II Lite, Region IV, Photo Log**



**OFFICIAL PHOTOGRAPH NO.: 29**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW08	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1300
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Overview near sample location SMSSDSW08 on Flenniken Branch.		





**OFFICIAL PHOTOGRAPH NO.: 30**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW08	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1300
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Culvert after heavy rain event near sample location SMSSDSW08 on Flenniken Branch.		





**OFFICIAL PHOTOGRAPH NO.: 31**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW08	<b>Date:</b>	May 3, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1300
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Culvert after heavy rain event upstream of sample location SMSSDSW08 on Flenniken Branch.		





**OFFICIAL PHOTOGRAPH NO.: 32**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW04	<b>Date:</b>	May 4, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~0930
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Wetland Adjacent to sample location SMSSDSW04.		





**OFFICIAL PHOTOGRAPH NO.: 33**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW04	<b>Date:</b>	May 4, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~0930
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Wetland Adjacent to sample location SMSSDSW04.		





**OFFICIAL PHOTOGRAPH NO.: 34**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW04	<b>Date:</b>	May 4, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~0930
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Culvert upstream of sample location SMSSDSW04 The pool was created by a rug that dammed up the stream downstream of culvert outfall..		





**OFFICIAL PHOTOGRAPH NO.: 35**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW04	<b>Date:</b>	May 4, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~0930
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	C.J. Roebuck of J.M. Waller collects water quality readings at sampling location SMSSDSW04 on Flenniken Branch.		





**OFFICIAL PHOTOGRAPH NO.: 36**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW04	<b>Date:</b>	May 4, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~0930
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Sampling location SMSSDSW04 on Flenniken Branch with gravelly riffle.		





**OFFICIAL PHOTOGRAPH NO.: 37**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW03	<b>Date:</b>	May 4, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1030
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Sampling location SMSSDSW03, approximately 30 to 40 ft. from confluence of Flenniken Branch and site discharge channel.		





**OFFICIAL PHOTOGRAPH NO.: 38**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW03	<b>Date:</b>	May 4, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1030
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Downstream of sampling location SMSSDSW03.		





**OFFICIAL PHOTOGRAPH NO.: 39**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW01	<b>Date:</b>	May 4, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1145
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Background sample location SMSSDSW01, approximately 20 to 30 ft. downstream from site culvert. .		





**OFFICIAL PHOTOGRAPH NO.: 40**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW01	<b>Date:</b>	May 4, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1145
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Background sample location SMSSDSW01, approximately 20 to 30 ft. downstream from site culvert. Evidence of pipes sticking out of banks,.		





**OFFICIAL PHOTOGRAPH NO.: 41**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW01	<b>Date:</b>	May 4, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1145
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Bank Erosion at sampling location SMSSDSW01.		





**OFFICIAL PHOTOGRAPH NO.: 42**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW01	<b>Date:</b>	May 4, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1145
<b>Orientation:</b>	XXXh		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Evidence of bank erosion at sampling location SMSSDSW01.		





**OFFICIAL PHOTOGRAPH NO.: 43**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW01	<b>Date:</b>	May 4, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1145
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Tod Delong of Avatar Environmental collecting the background sample at location SMSSDSW01..		





**OFFICIAL PHOTOGRAPH NO.: 44**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW01	<b>Date:</b>	May 4, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1145
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Evidence of bank erosion / slumping at sample location SMSSDSW01.		





**OFFICIAL PHOTOGRAPH NO.: 45**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSDSW01	<b>Date:</b>	May 4, 2011
<b>Photo Number:</b>	NA	<b>Time:</b>	~1145
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Jack Kuiper, JMWA		
<b>Subject:</b>	Honeysuckle Shrub on bank at sample location SMSSDSW01.		





**OFFICIAL PHOTOGRAPH NO.: 46**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Knob Creek Embayment – I.C. King Park	<b>Date:</b>	May 5, 2011
<b>Photo Number:</b>	038	<b>Time:</b>	0935
<b>Orientation:</b>	East		
<b>Photographer:</b>	Tim Woods, Avatar Environmental		
<b>Subject:</b>	Fish Collection. Team prepares for electroshocking within the Knob Creek Embayment near the Flenniken Branch confluence. Photographed: Jim Negus and Rod Lindbom of Tennessee Wildlife Resource Agency (TWRA) and Tod DeLong, Avatar Environmental.		





**OFFICIAL PHOTOGRAPH NO.: 47**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Knob Creek Embayment – I.C. King Park	<b>Date:</b>	May 5, 2011
<b>Photo Number:</b>	040	<b>Time:</b>	0940
<b>Orientation:</b>	North		
<b>Photographer:</b>	Tim Woods, Avatar Environmental		
<b>Subject:</b>	Fish Collection. Team deploys nets to capture fish after electroshocking within the Knob Creek Embayment near the Flenniken Branch confluence (Sample location SMSSDSW05). Photographed: Jim Negus and Rod Lindbom of Tennessee Wildlife Resource Agency (TWRA) and Tod DeLong, Avatar Environmental.		





**OFFICIAL PHOTOGRAPH NO. 48**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Knob Creek Embayment – I.C. King Park	<b>Date:</b>	May 5, 2011
<b>Photo Number:</b>	043	<b>Time:</b>	0955
<b>Orientation:</b>	South		
<b>Photographer:</b>	Tod DeLong, Avatar Environmental		
<b>Subject:</b>	Knob Creek Embayment oriented toward Knob Creek confluence. Fishing pier and entrance to IC King Park shown in the upper left corner.		





**OFFICIAL PHOTOGRAPH NO. 49**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** SMSSDSW10 – Knob Creek  
I.C. King Park

**Date:** May 5, 2011

**Photo Number:** 044

**Time:** 1002

**Orientation:** East

**Photographer:**

**Subject:** Fish Collection. Team deploys nets to capture fish after electroshocking within the Knob Creek (Sample location SMSSDSW10). Sample location, SMSSDSW10 is a background location situated upstream of Knob Creek Embayment. Photographed: Jim Negus and Rod Lindbom of Tennessee Wildlife Resource Agency (TWRA) and Tod DeLong, Avatar Environmental.





**OFFICIAL PHOTOGRAPH NO. 50**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Knob Creek Embayment – IC King Park	<b>Date:</b>	May 5, 2011
<b>Photo Number:</b>	048	<b>Time:</b>	1520
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Tod DeLong, Avatar Environmental		
<b>Subject:</b>	Large carp collected in Knob Creek Embayment. Due to the unavailability of catfish within Knob Creek Embayment, carp was collected.		





**OFFICIAL PHOTOGRAPH NO. 51**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Entrance to Smokey Mountain Smelters  
Caleb Street near water supply

**Date:** May 5, 2011

**Photo Number:** 049

**Time:** 1530

**Orientation:** West

**Photographer:**

**Subject:** Jack Kuiper, JMWA and Tod DeLong, Avatar Environmental process a fish (carp) for sample collection.





**Creek Near Sampling Location 3**



**Creek Near Sampling Location 3**





**Wetland Adjacent to Sampling Location 4**



**Upstream Sampling Location 6**





**Wetland Adjacent to Sampling Location 4**





**Wetland Sampling Location 6**



**Cattail Wetland, Sampling Location 6**





**Wetland, Sampling Location 6**



**Wetland, Sampling Location 6**





**Yellow Flag, Sampling Location 6**



**Wetland, Sampling Location 6**





**Wetland Sampling, Location 6**



**Wetland, Sampling Location 6**





**Yellow Flag, Sampling Location 6**





**Yellow Flag, Sampling Location 6**



**Wetland, Sampling Location 6**





**Upstream from Sampling Location 9**



**Culvert Sampling Location 9**





**Sampling Location Site 9**



**Stream Bank Erosion Sampling Location 9**





**Near Sampling Location Site 9**



**Honeysuckle Shrub Sampling Location 9**





**Spring at Sampling Location 9**



**Overview Creek Sampling Location 8**





**Overview Creek Sampling Location 8**



**Sampling Location Creek Site 8**





**Upstream of Sampling Location Creek Site 8**



**Wetland Adjacent to Sampling Location 4**





**Wetland Adjacent to Sampling Location 4**



**Culvert/Pool Upstream of Sampling Location 4**





**Sampling Location 4**



**Sampling Location 4**





**Sampling Location 3**



**Downstream of Sampling Location 3**





**Downstream of Sampling Location 3, Buffer Lacking**



**Upstream of Sampling Location 1**





**Bank Erosion at Sampling Location 1**



**Bank Erosion at Sampling Location 1**





**Sampling Location 1**



**Bank Erosion/Slumping at Sampling Location 1**





**Honeysuckle Shrub on Banks at Sampling Location 1**



**J.M. Waller Associates, Inc.**

**Remedial Action Contract II Lite, Region IV, Photo Log**

<b>Contract:</b>	EP-S4-08-03	<b>Site Name:</b>	Smokey Mountain Smelters
<b>Task No.:</b>	019	<b>Date:</b>	June 2011
<b>RPM:</b>	Rusty Kestle	<b>Project Mgt.:</b>	Janice Austin
<b>PHOTO LOG</b>			

**Phase 4, Geophysical Survey conducted on June 6, 2011 by University of Tennessee, Knoxville.**

**ACKNOWLEDGEMENTS**

<b>SIGNATURE</b>	<b>Date:</b>	<b>PM SIGNATURE</b>	<b>Date:</b>
------------------	--------------	---------------------	--------------



**J.M. Waller Associates, Inc.**  
**RAC II Lite, Region IV, Photo Log**



**OFFICIAL PHOTOGRAPH NO. 1**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters

**Date:** June 6, 2011

**Photo Number:**

**Time:**

**Orientation:** East

**Photographer:** Janice Austin

**Subject:** Transect for seismic refraction survey running East to West through the footprint of the former settling pond. Photographed: Graduate student from University of Tennessee (foreground) and Lee Barron, TDEC (background).



**J.M. Waller Associates, Inc.**

**Remedial Action Contract II Lite, Region IV, Photo Log**

<b>Contract:</b>	EP-S4-08-03	<b>Site Name:</b>	Smokey Mountain Smelters
<b>Task No.:</b>	019	<b>Date:</b>	September 2011
<b>RPM:</b>	Rusty Kestle	<b>Project Mgt.:</b>	Janice Austin
<b>PHOTO LOG</b>			

During the week of September 26, 2011, J. M. Waller, Inc. returned to Smokey Mountain Smelters for additional sample collection. The following photographs show the conditions of the drainage ditches on the east and west side of the site, particularly as it relates to sample location SMSSWSD02, and the benthic macroinvertebrate survey conducted on Flenniken Branch in the vicinity of SMSSWSD11.

**ACKNOWLEDGEMENTS**

<b>SIGNATURE</b>	<b>Date:</b>	<b>PM SIGNATURE</b>	<b>Date:</b>
------------------	--------------	---------------------	--------------





**OFFICIAL PHOTOGRAPH NO. 1**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters	<b>Date:</b>	September 26, 2011
<b>Photo Number:</b>	DSCI0104	<b>Time:</b>	1418
<b>Orientation:</b>	North Northeast		
<b>Photographer:</b>	Janice Austin		
<b>Subject:</b>	Drainage ditch along east side of Smokey Mountain Smelter Site, upstream of SMSSWSD02. The ditch sediment was moist, but no evidence of pooling water was found.		





**OFFICIAL PHOTOGRAPH NO. 2**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters	<b>Date:</b>	September 26, 2011
<b>Photo Number:</b>	DSCI0105	<b>Time:</b>	1418
<b>Orientation:</b>	North northeast		
<b>Photographer:</b>	Janice Austin		
<b>Subject:</b>	Sample location SMSSWSD02 in the Unnamed Tributary south of Smokey Mountain Smelters. The sediment was moist, however, no water was found.		





**OFFICIAL PHOTOGRAPH NO. 3**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters	<b>Date:</b>	September 26, 2011
<b>Photo Number:</b>	DSCI0106	<b>Time:</b>	1419
<b>Orientation:</b>	North northeast		
<b>Photographer:</b>	Janice Austin		
<b>Subject:</b>	Sample location SMSSWSD02 in the Unnamed Tributary south of Smokey Mountain Smelters. The sediment was moist, however, no water was found.		





**OFFICIAL PHOTOGRAPH NO. 4**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters	<b>Date:</b>	September 26, 2011
<b>Photo Number:</b>	DSCI0107	<b>Time:</b>	1419
<b>Orientation:</b>	North northeast		
<b>Photographer:</b>	Janice Austin		
<b>Subject:</b>	Sample location SMSSWSD02 in the Unnamed Tributary south of Smokey Mountain Smelters. The sediment was moist, however, no water was found.		





**OFFICIAL PHOTOGRAPH NO. 5**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters	<b>Date:</b>	September 26, 2011
<b>Photo Number:</b>	DSCI0108	<b>Time:</b>	1419
<b>Orientation:</b>	East		
<b>Photographer:</b>	Janice Austin		
<b>Subject:</b>	Sample location SMSSWSD02 in the Unnamed Tributary south of Smokey Mountain Smelters. The vegetation was high and evidence that water had recently flowed, however, no water was found for purposes of sample collection.		





**OFFICIAL PHOTOGRAPH NO. 6**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters

**Date:** September 26, 2011

**Photo Number:** DSCI0109

**Time:** 1419

**Orientation:** East

**Photographer:** Janice Austin

**Subject:** Sample location SMSSWSD02 in the Unnamed Tributary south of Smokey Mountain Smelters. The vegetation was high and evidence that water had recently flowed, however, no water was found for purposes of sample collection.





**OFFICIAL PHOTOGRAPH NO. 7**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters	<b>Date:</b>	September 26, 2011
<b>Photo Number:</b>	DSCI0110	<b>Time:</b>	1423
<b>Orientation:</b>	Southwest		
<b>Photographer:</b>	Linda Nyland		
<b>Subject:</b>	The drainage ditch on the western side of the Smokey Mountain Smelters site. No water was found in the ditch, however, the soil was moist and vegetation thick.		





**OFFICIAL PHOTOGRAPH NO. 8**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters	<b>Date:</b>	September 26, 2011
<b>Photo Number:</b>	DSCI0111	<b>Time:</b>	1423
<b>Orientation:</b>	Southwest		
<b>Photographer:</b>	Linda Nyland		
<b>Subject:</b>	The drainage ditch on the western side of the Smokey Mountain Smelters site. No water was found in the ditch, however, the soil was moist and vegetation thick.		

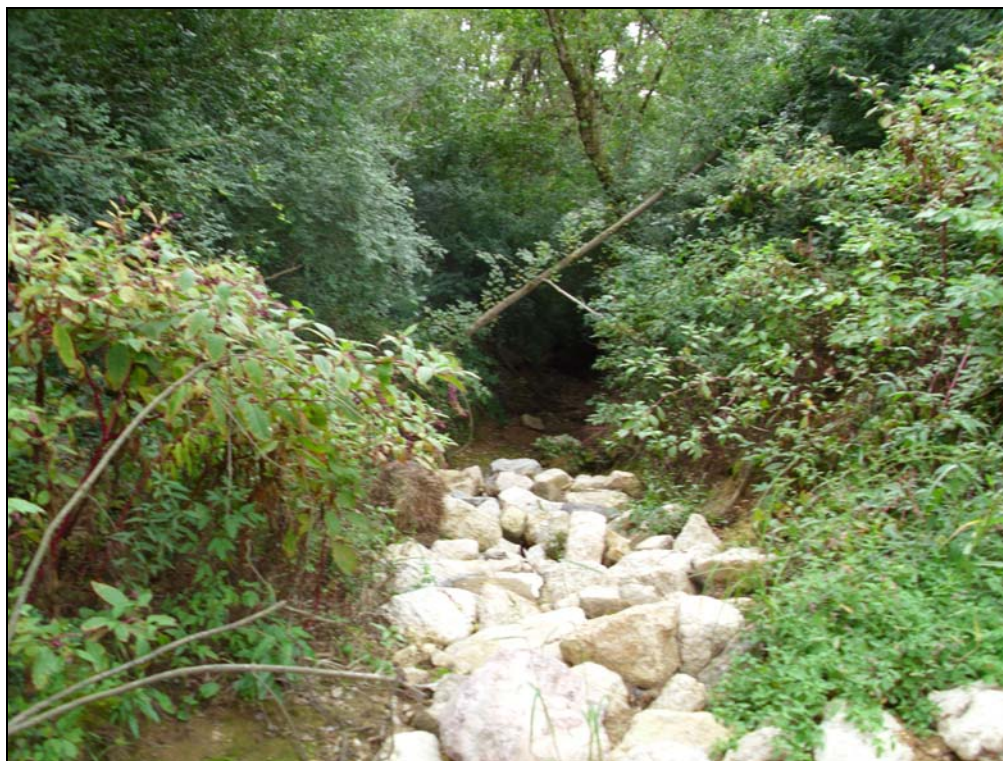




**OFFICIAL PHOTOGRAPH NO. 9**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters	<b>Date:</b>	September 26, 2011
<b>Photo Number:</b>	DSCI0112	<b>Time:</b>	1425
<b>Orientation:</b>	South southeast		
<b>Photographer:</b>	Linda Nyland		
<b>Subject:</b>	The drainage ditch on the western side of the Smokey Mountain Smelters site. No water was found in the ditch, however, the soil was moist and vegetation thick.		





**OFFICIAL PHOTOGRAPH NO. 10**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters	<b>Date:</b>	September 26, 2011
<b>Photo Number:</b>	DSCI0113	<b>Time:</b>	XXXX
<b>Orientation:</b>	East		
<b>Photographer:</b>	Linda Nyland		
<b>Subject:</b>	The confluence of the eastern and western drainage ditches at the Smokey Mountain Smelters site. Despite moist sediment, no pooling water was found in this area.		





**OFFICIAL PHOTOGRAPH NO. 11**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters	<b>Date:</b>	September 28, 2011
<b>Photo Number:</b>	DSCI0114	<b>Time:</b>	0945
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Linda Nyland		
<b>Subject:</b>	Debris and a snapping turtle in Flenniken Branch at sample location SMSSWSD11.		





**OFFICIAL PHOTOGRAPH NO. 12**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters	<b>Date:</b>	September 28, 2011
<b>Photo Number:</b>	DSCI0115	<b>Time:</b>	0945
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Linda Nyland		
<b>Subject:</b>	Debris and a snapping turtle (above the red rug) in Flenniken Branch at sample location SMSSWSD11.		





**OFFICIAL PHOTOGRAPH NO. 13**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters	<b>Date:</b>	September 28, 2011
<b>Photo Number:</b>	DSCI0116	<b>Time:</b>	0959
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Linda Nyland		
<b>Subject:</b>	Larry Everett, Tennessee Department of Environment and Conservation (TDEC) and Tod DeLong, Avatar Environmental (Avatar) conducts a macroinvertebrate survey at sample location SMSSWSD11 in Flenniken Branch.		





**OFFICIAL PHOTOGRAPH NO. 14**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters

**Date:** September 28, 2011

**Photo Number:** DSCI0117

**Time:** 0959

**Orientation:** NA

**Photographer:** Linda Nyland

**Subject:** Larry Every, TDEC and Tod DeLong, Avatar using the kickscreen prior to sample collection for macroinvertebrate survey at sample location SMSSWSD11 in Flenniken Branch.





**OFFICIAL PHOTOGRAPH NO. 15**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters

**Date:** September 28, 2011

**Photo Number:** DSCI0118

**Time:** 0959

**Orientation:** NA

**Photographer:** Linda Nyland

**Subject:** Larry Everett, TDEC and Tod DeLong, Avatar using the kickscreen prior to sample collection for macroinvertebrate survey at sample location SMSSWSD11 in Flenniken Branch, Kristina Early, Avatar, records water quality readings.





**OFFICIAL PHOTOGRAPH NO. 16**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters

**Date:** September 28, 2011

**Photo Number:** DSCI0119

**Time:** 1000

**Orientation:** NA

**Photographer:** Linda Nyland

**Subject:** Larry Everett, TDEC and Tod DeLong, Avatar conducting macroinvertebrate survey at sample location SMSSWSD11 in Flenniken Branch.





**OFFICIAL PHOTOGRAPH NO. 17**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters

**Date:** September 28, 2011

**Photo Number:** DSCI0120

**Time:** 1002

**Orientation:** NA

**Photographer:** Linda Nyland

**Subject:** Tod DeLong, Avatar collects macroinvertebrate samples from kickscreen during macroinvertebrate survey at sample location SMSSWSD11 in Flenniken Branch.





**OFFICIAL PHOTOGRAPH NO. 18**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters	<b>Date:</b>	September 28, 2011
<b>Photo Number:</b>	DSCI0121	<b>Time:</b>	1003
<b>Orientation:</b>	NA		
<b>Photographer:</b>	Linda Nyland Everett		
<b>Subject:</b>	Tod DeLong, Avatar collects macroinvertebrate samples from kickscreen during macroinvertebrate survey at sample location SMSSWSD11 in Flenniken Branch, while Larry Everett, TDEC, and Kristina Early, Avatar, collect water quality readings.		



**J.M. Waller Associates, Inc.**

**Remedial Action Contract II Lite, Region IV, Photo Log**

<b>Contract:</b>	EP-S4-08-03	<b>Site Name:</b>	Smokey Mountain Smelters
<b>Task No.:</b>	019	<b>Date:</b>	Jan 2012
<b>RPM:</b>	Rusty Kestle	<b>Project Mgt.:</b>	Janice Austin
<b>PHOTO LOG</b>			

--	--

<b>ACKNOWLEDGEMENTS</b>			
<b>SIGNATURE</b>	<b>Date:</b>	<b>PM SIGNATURE</b>	<b>Date:</b>





**OFFICIAL PHOTOGRAPH NO.: 1**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters Cap	<b>Date:</b>	Jan 17, 2012
<b>Photo Number:</b>	1	<b>Time:</b>	1120
<b>Orientation:</b>	North		
<b>Photographer:</b>	C. Brandon Clowers, TetraTech		
<b>Subject:</b>	Electroresistivity Imaging (ERI) testing equipment ready at ERI-1.		





**OFFICIAL PHOTOGRAPH NO.: 2**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 17, 2012
Photo Number:	2	Time:	1135
Orientation:	Facing North		
Photographer:	C. Brandon Clowers, TetraTech		
Subject:	ERI-1 profile view from southwest end toward northeast. This profile line is approximately 900 feet long.		





**OFFICIAL PHOTOGRAPH NO.: 3**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 17, 2012
Photo Number:	3	Time:	1400
Orientation:	North		
Photographer:	C. Brandon Clowers, TetraTech		
Subject:	ERI-2 profile at south end looking north. This profile line is also approximately 900feet long.		





**OFFICIAL PHOTOGRAPH NO.: 4**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 17, 2012
Photo Number:	4	Time:	1545
Orientation:	North		
Photographer:	C. Brandon Clowers, TetraTech		
Subject:	ERI-3 profile view east looking toward west southwest.		





**OFFICIAL PHOTOGRAPH NO.: 5**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 18, 2012
Photo Number:	5	Time:	1120
Orientation:	North		
Photographer:	C. Brandon Clowers, TetraTech		
Subject:	ERI-4 profile view north looking toward south.		





**OFFICIAL PHOTOGRAPH NO.: 6**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 18, 2012
Photo Number:	6	Time:	1500
Orientation:	North		
Photographer:	C. Brandon Clowers, TetraTech		
Subject:	ERI-5 View toward southeast end of 900 foot profile line.		





**OFFICIAL PHOTOGRAPH NO.: 7**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 18, 2012
Photo Number:	7	Time:	0955
Orientation:	North		
Photographer:	C. Brandon Clowers, TetraTech		
<b>Subject:</b>	Set up for Seismic tomography at Seismic-1 profile.		





**OFFICIAL PHOTOGRAPH NO. 8**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 18, 2012
Photo Number:	8	Time:	1010
Orientation:	North		
Photographer:	C. Brandon Clowers, TetraTech		
<b>Subject:</b>	Seismic-1 profile south end looking toward north.		





**OFFICIAL PHOTOGRAPH NO. 9**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 18, 2012
Photo Number:	9	Time:	1200
Orientation:	South		
Photographer:	C. Brandon Clowers, TetraTech		
Subject:	Seismic-2 profile view from northwest end to southeast end at south section of SMS.		





**OFFICIAL PHOTOGRAPH NO. 10**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 18, 2012
Photo Number:	10	Time:	1345
Orientation:	South		
Photographer:	C. Brandon Clowers, TetraTech		
<b>Subject:</b>	Seismic-3 profile view from northwest end to southeast end at south section of SMS just north and parallel of Seismic-2.		





**OFFICIAL PHOTOGRAPH NO. 11**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location: Smokey Mountain Smelters Cap

Date: Jan 18, 2012

Photo Number: 11

Time: 1345

Orientation: South

Photographer: C. Brandon Clowers, TetraTech

**Subject:** Seismic-4 profile view from northwest end to southeast end at south section of SMS just north and parallel of Seismic-3.





**OFFICIAL PHOTOGRAPH NO. 12**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 19, 2012
Photo Number:	12	Time:	0910
Orientation:	South		
Photographer:	C. Brandon Clowers, TetraTech		
Subject:	Seismic-5 profile view from northwest end to southeast end at south section of SMS just north and parallel of Seismic-4.		





**OFFICIAL PHOTOGRAPH NO. 13**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 19, 2012
Photo Number:	13	Time:	1100
Orientation:	South		
Photographer:	C. Brandon Clowers, TetraTech		
<b>Subject:</b>	Seismic-6 profile view from southwest end to northeast end at south section of SMS.		





**OFFICIAL PHOTOGRAPH NO. 14**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 19, 2012
Photo Number:	14	Time:	1200
Orientation:	South		
Photographer:	C. Brandon Clowers, TetraTech		
Subject:	Seismic-7 profile view from northwest end to southeast end at south section of SMS just north of Seismic-6.		





**OFFICIAL PHOTOGRAPH NO. 15**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 19, 2012
Photo Number:	15	Time:	1230
Orientation:	South		
Photographer:	C. Brandon Clowers, TetraTech		
Subject:	Seismic-8 profile view from southwest end to northeast end at center section and perpendicular to Seismic-3, Seismic-4.		





**OFFICIAL PHOTOGRAPH NO. 16**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 19, 2012
Photo Number:	16	Time:	1440
Orientation:	South		
Photographer:	C. Brandon Clowers, TetraTech		
Subject:	Seismic-9 profile view from southwest end to northeast end at center section of SMS just north and perpendicular of Seismic-5.		





**OFFICIAL PHOTOGRAPH NO. 17**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 19, 2012
Photo Number:	17	Time:	1610
Orientation:	South		
Photographer:	C. Brandon Clowers, TetraTech		
Subject:	Seismic-10 profile view from southwest end to northeast end at northeastern quadrant of SMS.		





**OFFICIAL PHOTOGRAPH NO. 18**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 19, 2012
Photo Number:	18	Time:	1615
Orientation:	South		
Photographer:	C. Brandon Clowers, TetraTech		
Subject:	View of sledge hammer used for Seismic testing.		





**OFFICIAL PHOTOGRAPH NO. 19**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 19, 2012
Photo Number:	19	Time:	1625
Orientation:	South		
Photographer:	C. Brandon Clowers, TetraTech		
<b>Subject:</b>	Use of the sledge hammer on metal plate to provide Seismic energy source.		





**OFFICIAL PHOTOGRAPH NO. 20**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

Location:	Smokey Mountain Smelters Cap	Date:	Jan 19, 2012
Photo Number:	20	Time:	1110
Orientation:	South		
Photographer:	C. Brandon Clowers, TetraTech		
<b>Subject:</b>	Total Station surveying of ERI Profile.		



**J.M. Waller Associates, Inc.**

**Remedial Action Contract II Lite, Region IV, Photo Log**

<b>Contract:</b>	EP-S4-08-03	<b>Site Name:</b>	Smokey Mountain Smelters
<b>Task No.:</b>	019	<b>Date:</b>	April 2012
<b>RPM:</b>	Rusty Kestle	<b>Project Mgt.:</b>	Janice Austin
<b>PHOTO LOG</b>			

Sediment sampling conducted on April 16 and 17, 2012 by J.M. Waller Associates, Inc. at historical sample locations for purposes of toxicity testing.

**ACKNOWLEDGEMENTS**

<b>SIGNATURE</b>	<b>Date:</b>	<b>PM SIGNATURE</b>	<b>Date:</b>
------------------	--------------	---------------------	--------------





**OFFICIAL PHOTOGRAPH NO. 1**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSD03	<b>Date:</b>	April 16, 2012
<b>Photo Number:</b>	DSCN0436	<b>Time:</b>	1443
<b>Orientation:</b>	East Northeast		
<b>Photographer:</b>	Linda Nyland		
<b>Subject:</b>	C.J. Roebuck of J.M. Waller Associates, Inc., (J.M. Waller) collecting a GPS location point after the collection of sediment sample SMSSD03 on Flenniken Branch. This location is west of Smokey Mountain Smelter Site.		





**OFFICIAL PHOTOGRAPH NO. 2**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSD08	<b>Date:</b>	April 16, 2012
<b>Photo Number:</b>	DSCN0437	<b>Time:</b>	1805
<b>Orientation:</b>	Northeast		
<b>Photographer:</b>	C.J. Roebuck		
<b>Subject:</b>	Culvert located near sediment sample location SMSSD08, on Flenniken Branch. This location is west of Witherspoon Dump.		





**OFFICIAL PHOTOGRAPH NO. 3**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSD08	<b>Date:</b>	April 16 , 2012
<b>Photo Number:</b>	DSCN0438	<b>Time:</b>	1806
<b>Orientation:</b>	Southeast		
<b>Photographer:</b>	C.J. Roebuck		
<b>Subject:</b>	Secondary culvert near sampling location SMSSD08.		





**OFFICIAL PHOTOGRAPH NO. 4**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSD11	<b>Date:</b>	April 17, 2012
<b>Photo Number:</b>	DSCN0439	<b>Time:</b>	1454
<b>Orientation:</b>	South		
<b>Photographer:</b>	Linda Nyland		
<b>Subject:</b>	C.J. Roebuck (J.M. Waller) rinsing sampling equipment after collecting the background sediment sample at SMSSD11.		





**OFFICIAL PHOTOGRAPH NO. 5**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSD11	<b>Date:</b>	April 17, 2012
<b>Photo Number:</b>	DSCN0440	<b>Time:</b>	1455
<b>Orientation:</b>	Southeast		
<b>Photographer:</b>	Linda Nyland		
<b>Subject:</b>	C.J. Roebuck (J.M. Waller) packing the cooler with sediment samples after collection at background location SMSSD11.		





**OFFICIAL PHOTOGRAPH NO. 6**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSD04	<b>Date:</b>	April 17, 2012
<b>Photo Number:</b>	DSCN0444	<b>Time:</b>	1837
<b>Orientation:</b>	South Southeast		
<b>Photographer:</b>	Linda Nyland		
<b>Subject:</b>	The west bank of Flenniken branch near the location where sediment sample SMSSD04 was collected.		





**OFFICIAL PHOTOGRAPH NO. 7**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	SMSSD04	<b>Date:</b>	April 17, 2012
<b>Photo Number:</b>	DSCN0445	<b>Time:</b>	1837
<b>Orientation:</b>	Northeast		
<b>Photographer:</b>	Linda Nyland		
<b>Subject:</b>	Sediment sample location SMSSD04, located on Flenniken Branch, southwest of the Smokey Mountain Smelter Site. Photograph was taken after sample collection. Note in the middle ground of the image, a discarded rug is laying in the creek.		





**OFFICIAL PHOTOGRAPH NO. 8**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** SMSSD11 **Date:** May 8, 2012

**Photo Number:** IMAG1210 **Time:** 1326

**Orientation:** East

**Photographer:** Linda Nyland

**Subject:** Terence Chuhay (J. M. Waller) prior to collection of the background sediment sample at SMSSD11. This is a re-sample at this location after the samples collected on 4/17/2012 were lost in shipping and arrived at the lab exceeding the temperature requirements.





**OFFICIAL PHOTOGRAPH NO. 8**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** SMSSD11 **Date:** May 8, 2012

**Photo Number:** IMAG1211 **Time:** 1326

**Orientation:** East

**Photographer:** Linda Nyland

**Subject:** Terence Chuhay (J. M. Waller) collecting the background sediment sample at SMSSD11. This is a re-sample at this location after the samples collected on 4/17/2012 were lost in shipping and arrived at the lab exceeding the temperature requirements.



Official Photograph No. 1



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	5-7 ft.	<b>Depth Interval in Photo:</b>	6.2-7 ft.
<b>Image No:</b>	MW-01_5-7_ft(1).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: clay, red (2.4 YR 4/6), stiff, slightly plastic, moist.					

Official Photograph No. 2



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	10-12 ft.	<b>Depth Interval in Photo:</b>	10.0-10.5 ft.
<b>Image No:</b>	MW-01_10-12_ft(1).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: waste (Anthropogenic fill), black organic material.					

Official Photograph No. 3



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	10-12 ft.	<b>Depth Interval in Photo:</b>	10.3-11.3 ft
<b>Image No:</b>	MW-01_10-12_ft(2).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: clay, strong brown (7.5YR 5/8), very stiff, slightly plastic, moist.					



Official Photograph No. 4



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	10-12 ft.	<b>Depth Interval in Photo:</b>	11.3-12 ft.
<b>Image No:</b>	MW-01_10-12_ft(3).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: clay, strong brown (7.5YR 5/8), very stiff, slightly plastic, moist.					

Official Photograph No. 5



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	15-17 ft.	<b>Depth Interval in Photo:</b>	15-15.7 ft
<b>Image No:</b>	MW-01_15-17_ft(1).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: clay, mottled brown (7.5 YR 5/8) and dark brown (7.5 YR 3/3), very stiff, slightly plastic, moist, minor chert fragments.					

Official Photograph No. 6



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	15-17 ft.	<b>Depth Interval in Photo:</b>	15.7-16.5 ft
<b>Image No:</b>	MW-01_15-17_ft(2).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	XXXX
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: clay, mottled brown (7.5 YR 5/8) and dark brown (7.5 YR 3/3), very stiff, slightly plastic, moist, minor chert fragments.					



Official Photograph No. 7



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	15-17 ft	<b>Depth Interval in Photo:</b>	16.5-17 ft
<b>Image No:</b>	MW-01_15-17_ft(3).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: clay, mottled brown (7.5 YR 5/8) and dark brown (7.5 YR 3/3), very stiff, slightly plastic, moist, minor chert fragments.					

Official Photograph No. 8



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	20-22 ft.	<b>Depth Interval in Photo:</b>	20-21.8 ft
<b>Image No:</b>	MW-01_20-22_ft(1).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: clay, mottled strong brown (7.5 YR 5/8) and dark brown (7.5 YR 3/3), stiff, slightly plastic, very moist, minor chert fragments.					

Official Photograph No. 9



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	20-22 ft.	<b>Depth Interval in Photo:</b>	21.4-22 ft
<b>Image No:</b>	MW-01_20-22_ft(2).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	XXXX
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: clay, mottled strong brown (7.5 YR 5/8) and dark brown (7.5 YR 3/3), stiff, slightly plastic, very moist, minor chert fragments.					



Official Photograph No. 10



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	25-27 ft	<b>Depth Interval in Photo:</b>	25.4-26.5 ft
<b>Image No:</b>	MW-01_25-27_ft(2).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: silty clay, strong brown (7.5 YR 5/8) mottled (15%) with dark brown (7.5 YR 3/3), very stiff, friable, dry & crumbly, laminated fabric.					

Official Photograph No. 11



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	25-27 ft	<b>Depth Interval in Photo:</b>	26.1-27 ft
<b>Image No:</b>	MW-01_25-27_ft(3).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: silty clay, strong brown (7.5 YR 5/8) mottled (15%) with dark brown (7.5 YR 3/3), very stiff, friable, dry & crumbly, laminated fabric.					

Official Photograph No. 12



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	30-32 ft	<b>Depth Interval in Photo:</b>	30-30.8 ft
<b>Image No:</b>	MW-01_30-32_ft(1).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	XXXX
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: silty clay, mottled yellow (10 YR 5/8) and dark yellow brown (10 YR 4/4), soft, plastic, moist, minor gravel.					



Official Photograph No. 13



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	30-32 ft	<b>Depth Interval in Photo:</b>	30.5-31.5 ft
<b>Image No:</b>	MW-01_30-32_ft(2).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: silty clay, mottled yellow brown (10 YR 5/8) and dark yellow brown (10 YR 4/4), soft, plastic, moist, minor gravel.					

Official Photograph No. 14



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	30-32 ft	<b>Depth Interval in Photo:</b>	31.4-32 ft
<b>Image No:</b>	MW-01_30-32_ft(3).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: silty clay, mottled yellow brown (10 YR 5/8) and dark yellow brown (10 YR 4/4), soft, plastic, moist, minor gravel.					

Official Photograph No. 15



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	35-37 ft	<b>Depth Interval in Photo:</b>	35-36.2 ft
<b>Image No:</b>	MW-01_35-37_ft(1).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	XXXX
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: silty clay, yellow brown (10 YR 5/8), soft, plastic, very moist.					



Official Photograph No. 16



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	35-37 ft	<b>Depth Interval in Photo:</b>	35.6-36.8 ft
<b>Image No:</b>	MW-01_35-37_ft(2).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: silty clay, yellow brown (10 YR 5/8), soft, plastic, very moist.					

Official Photograph No. 17



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	35-37 ft	<b>Depth Interval in Photo:</b>	36.3-37 ft
<b>Image No:</b>	MW-01_35-37_ft(3).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: silty clay, yellow brown (10 YR 5/8), soft, plastic, very moist.					

Official Photograph No. 18



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	40-42 ft	<b>Depth Interval in Photo:</b>	40-41 ft
<b>Image No:</b>	MW-01_40-42_ft(1).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	XXXX
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: silty clay, yellow brown (10 YR 5/8), very soft, plastic, very moist to wet, minor dolomitic gravel.					



Official Photograph No. 19



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	40-42 ft	<b>Depth Interval in Photo:</b>	40.6-41.6 ft
<b>Image No:</b>	MW-01_40-42_ft(2).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: silty clay, yellow brown (10 YR 5/8), very soft, plastic, very moist to wet, minor dolomitic gravel.					

Official Photograph No. 20



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	40-42 ft	<b>Depth Interval in Photo:</b>	41.4-42 ft
<b>Image No:</b>	MW-01_40-42_ft(3).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: silty clay, yellow brown (10 YR 5/8), very soft, plastic, very moist to wet, minor dolomitic gravel.					

Official Photograph No. 21



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	45-47 ft	<b>Depth Interval in Photo:</b>	45.5-46.5 ft
<b>Image No:</b>	MW-01_45-47_ft(2).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	XXXX
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: silty clay, yellow brown (10 YR 5/8), very soft, plastic, very moist to wet, minor dolomitic gravel.					



Official Photograph No. 22



<b>Boring No:</b>	MW-01	<b>Split Spoon:</b>	45-47 ft	<b>Depth Interval in Photo:</b>	46-47 ft
<b>Image No:</b>	MW-01_45-47_ft(3).JPG			<b>Date:</b>	5/16/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-01A via hollow stem auger drilling techniques. Lithologic description: silty clay, yellow brown (10 YR 5/8), very soft, plastic, very moist to wet, minor dolomitic gravel. Refusal, end of boring at 46 feet below land surface.					



Official Photograph No. 23



<b>Boring No:</b>	MW-02	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	5-6.9 ft
<b>Image No:</b>	MW-02_5-7_ft(1).JPG			<b>Date:</b>	5/15/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-02A via hollow stem auger drilling techniques. Lithologic description: SILTY CLAY, red-brown (2.5YR 4/3), very soft, moist, wood debris, creosote odor.					

Official Photograph No. 24



<b>Boring No:</b>	MW-02	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	5.7-7 ft
<b>Image No:</b>	MW-02_5-7_ft(2).JPG			<b>Date:</b>	5/15/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-02A via hollow stem auger drilling techniques. Lithologic description: SILTY CLAY, red-brown (2.5YR 4/3), very soft, moist, wood debris, creosote odor. (Lower 0.4 inches WASTE (Anthropogenic fill), black, sandy granular material.					

Official Photograph No. 25



<b>Boring No:</b>	MW-02	<b>Split Spoon:</b>	10-12 ft	<b>Depth Interval in Photo:</b>	10-11.9 ft
<b>Image No:</b>	MW-02_10-12_ft(1).JPG			<b>Date:</b>	5/15/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	XXXX
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-02A via hollow stem auger drilling techniques. Lithologic description: CLAY, dark red-brown (2.5YR 5/8), stiff, moist and WASTE (Anthropogenic fill), blue-black (10G 2.5/1), grainular, wet, wood fragments, strong ammonia odor, NH3 >200 ppm.					



Official Photograph No. 26



<b>Boring No:</b>	MW-02	<b>Split Spoon:</b>	10-12 ft	<b>Depth Interval in Photo:</b>	11.2-12 ft
<b>Image No:</b>	MW-02_10-12_ft(2).JPG			<b>Date:</b>	5/15/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-02A via hollow stem auger drilling techniques. Lithologic description: WASTE (Anthropogenic fill), blue-black (10G 2.5/1), granular, wet, wood fragments, strong ammonia odor.					

Official Photograph No. 27



<b>Boring No:</b>	MW-02	<b>Split Spoon:</b>	15-17 ft	<b>Depth Interval in Photo:</b>	15-16.8 ft
<b>Image No:</b>	MW-02_15-17_ft(2).JPG			<b>Date:</b>	5/15/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-02A via hollow stem auger drilling techniques. Lithologic description: WASTE (Anthropogenic fill), blue-black (10G 2.5/1), granular, wet, wood fragments, strong ammonia odor.					

Official Photograph No. 28



<b>Boring No:</b>	MW-02	<b>Split Spoon:</b>	20-22 ft	<b>Depth Interval in Photo:</b>	21-22 ft
<b>Image No:</b>	MW-02_20-22_ft(2).JPG			<b>Date:</b>	5/15/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	XXXX
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-02A via hollow stem auger drilling techniques. Lithologic description: WASTE (Anthropogenic fill), blue-black (10G 2.5/1), granular, wet, wood fragments, strong ammonia odor.					



Official Photograph No. 29



<b>Boring No:</b>	MW-02	<b>Split Spoon:</b>	28-30 ft	<b>Depth Interval in Photo:</b>	28-30 ft
<b>Image No:</b>	MW-02_28-30_ft(1).JPG			<b>Date:</b>	5/15/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-02A via hollow stem auger drilling techniques. Lithologic description CLAY, strong brown (7.5YR 5/8), very stiff, dry.					

Official Photograph No. 30



<b>Boring No:</b>	MW-02	<b>Split Spoon:</b>	28-30 ft	<b>Depth Interval in Photo:</b>	29.2-30 ft
<b>Image No:</b>	MW-02_28-30_ft(2).JPG			<b>Date:</b>	5/15/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-02A via hollow stem auger drilling techniques. Lithologic description CLAY, strong brown (7.5YR 5/8), very stiff, dry.					



Official Photograph No. 31



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	6-7 ft
<b>Image No:</b>	MW-03(2)_5-7_ft.JPG			<b>Date:</b>	5/29/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow-red (5YR 5/8) mottled (25%) with yellow (10YR 7/8), very stiff, damp.					

Official Photograph No. 32



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	7-9 ft	<b>Depth Interval in Photo:</b>	8-9 ft
<b>Image No:</b>	MW-03(2)_7-9_ft(1).JPG			<b>Date:</b>	5/29/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow-red (5YR 5/8) mottled (25%) with yellow (10YR 7/8), very stiff, damp.					

Official Photograph No. 33



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	9-11 ft	<b>Depth Interval in Photo:</b>	9-10.3 ft
<b>Image No:</b>	MW-03(2)_9-11_ft(1).JPG			<b>Date:</b>	5/29/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: WASTE (Anthropogenic Fill), with soft moist grey (G1 6/1) CLAY, with plastic and light grey rock fragments					



Official Photograph No. 34



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	9-11 ft	<b>Depth Interval in Photo:</b>	10-11 ft
<b>Image No:</b>	MW-03(2)_9-11_ft(2).JPG			<b>Date:</b>	5/29/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: WASTE (Anthropogenic Fill), with soft moist grey (G1 6/1) CLAY, with plastic and light grey rock fragments.					

Official Photograph No. 35



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	11-13 ft	<b>Depth Interval in Photo:</b>	11-12 ft
<b>Image No:</b>	MW-03(2)_11-13_ft(1).JPG			<b>Date:</b>	5/29/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: WASTE (Anthropogenic Fill), black granular material, rubber, and wood.					

Official Photograph No. 36



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	11-13 ft	<b>Depth Interval in Photo:</b>	12.2-13 ft
<b>Image No:</b>	MW-03(2)_11-13_ft(2).JPG			<b>Date:</b>	5/29/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: WASTE (Anthropogenic Fill), black granular material, rubber, and wood.					



Official Photograph No. 37



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	13-15 ft	<b>Depth Interval in Photo:</b>	14.5-15 ft
<b>Image No:</b>	MW-03(2)_13-15_ft.JPG			<b>Date:</b>	5/29/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: WASTE (Anthropogenic Fill), rubber, and wood.					

Official Photograph No. 38



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	15-17 ft	<b>Depth Interval in Photo:</b>	15-16 ft
<b>Image No:</b>	MW-03(2)_15-17_ft(1).JPG			<b>Date:</b>	5/29/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: CLAY, strong brown (7.5YR 5/6), stiff, moist.					

Official Photograph No. 39



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	15-17 ft	<b>Depth Interval in Photo:</b>	16-17 ft
<b>Image No:</b>	MW-03(2)_15-17_ft(2).JPG			<b>Date:</b>	5/29/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: CLAY, strong brown (7.5YR 5/6), stiff, moist.					



Official Photograph No. 40



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	19-21 ft	<b>Depth Interval in Photo:</b>	19-20 ft
<b>Image No:</b>	MW-03(2)_19-21_ft(1).JPG			<b>Date:</b>	5/29/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: SILTY CLAY with SHALE, yellow-brown (10YR 5/6), stiff, dry, laminated fabric.					

Official Photograph No. 41



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	19-21 ft	<b>Depth Interval in Photo:</b>	20-21 ft
<b>Image No:</b>	MW-03(2)_19-21_ft(2).JPG			<b>Date:</b>	5/29/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: SILTY CLAY with SHALE, yellow-brown (10YR 5/6), stiff, dry, laminated fabric.					

Official Photograph No. 42



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	19-21 ft	<b>Depth Interval in Photo:</b>	25.1-26 ft
<b>Image No:</b>	MW-03(2)_24-26_ft(1).JPG			<b>Date:</b>	5/29/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: SILTY CLAY, yellow-brown (10YR 5/8), stiff, dry, laminated fabric.					



Official Photograph No. 43



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	34-38 ft	<b>Depth Interval in Photo:</b>	34-35 ft
<b>Image No:</b>	MW-03(2)_34-38_ft(1).JPG			<b>Date:</b>	5/31/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow-brown (10YR 5/6) to dark yellow-brown (10YR 3/6), soft, moist, with weathered shale and dolomite.					

Official Photograph No. 44



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	34-38 ft	<b>Depth Interval in Photo:</b>	35-36 ft
<b>Image No:</b>	MW-03(2)_34-38_ft(2).JPG			<b>Date:</b>	5/31/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow-brown (10YR 5/6) to dark yellow-brown (10YR 3/6), soft, moist, with weathered shale and dolomite.					

Official Photograph No. 45



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	34-38 ft	<b>Depth Interval in Photo:</b>	35.9- 36.5 ft
<b>Image No:</b>	MW-03(2)_34-38_ft(3).JPG			<b>Date:</b>	5/31/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow-brown (10YR 5/6) to dark yellow-brown (10YR 3/6), soft, moist, with weathered shale and dolomite.					



Official Photograph No. 46



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	38-43 ft	<b>Depth Interval in Photo:</b>	38-39 ft
<b>Image No:</b>	MW-03(2)_38-43_ft(1).JPG			<b>Date:</b>	5/31/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow-brown (10YR 5/6) to dark yellow-brown (10YR 3/6), soft, moist, with weathered shale and dolomite.					

Official Photograph No. 47



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	38-43 ft	<b>Depth Interval in Photo:</b>	39.6-40.3 ft
<b>Image No:</b>	MW-03(2)_38-43_ft(4).JPG			<b>Date:</b>	5/31/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow-brown (10YR 5/6) to dark yellow-brown (10YR 3/6), soft, moist, with weathered shale and dolomite.					

Official Photograph No. 48



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	38-43 ft	<b>Depth Interval in Photo:</b>	39.5-40.5 ft
<b>Image No:</b>	MW-03(2)_38-43_ft(6).JPG			<b>Date:</b>	5/31/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: LIMESTONE, grey and white, crystalline, massive, dolomitic, interbedded with shale. Mud filled fractures.					



Official Photograph No. 49



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	43-48 ft	<b>Depth Interval in Photo:</b>	43-44.8 ft
<b>Image No:</b>	MW-03(2)_43-48_ft(1).JPG			<b>Date:</b>	5/31/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: LIMESTONE, grey and white, crystalline, massive, dolomitic, interbedded with shale. Mud filled fractures.					

Official Photograph No. 50



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	43-48 ft	<b>Depth Interval in Photo:</b>	43-43.8 ft
<b>Image No:</b>	MW-03(2)_43-48_ft(4).JPG			<b>Date:</b>	5/31/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: LIMESTONE, grey and white, crystalline, massive, dolomitic, interbedded with shale. Mud filled fractures.					

Official Photograph No. 51



<b>Boring No:</b>	MW-03(2)	<b>Split Spoon:</b>	43-48 ft	<b>Depth Interval in Photo:</b>	44.5-45.5 ft
<b>Image No:</b>	MW-03(2)_43-48_ft(3).JPG			<b>Date:</b>	5/31/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: LIMESTONE, grey and white, crystalline, massive, dolomitic, interbedded with shale. Mud filled fractures.					



Official Photograph No. 52



<b>Boring No:</b>	MW-04(no well)	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	5-6.3 ft
<b>Image No:</b>	MW-04(1)_5-7(1).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: CLAY with chert, dark red-brown (5YR 3/4) mottled (10%) with yellow (10YR 7/8), very stiff, moist.					

Official Photograph No. 53



<b>Boring No:</b>	MW-04(no well)	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	6-7 ft
<b>Image No:</b>	MW-04(1)_5-7(2).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: CLAY, pale green (10G 8/2), crumbly, granular.					

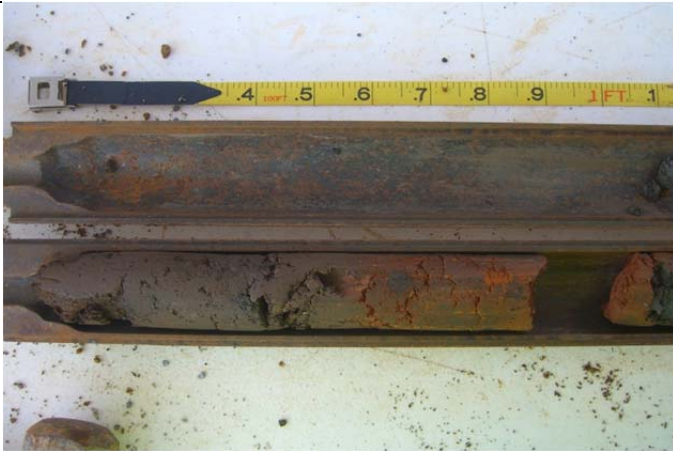
Official Photograph No. 54



<b>Boring No:</b>	MW-04(no well)	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	6.4-7 ft
<b>Image No:</b>	MW-04(1)_5-7(3).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-03B via hollow stem auger drilling techniques. Lithologic description: CLAY, pale green (10G 8/2), crumbly, granular.					

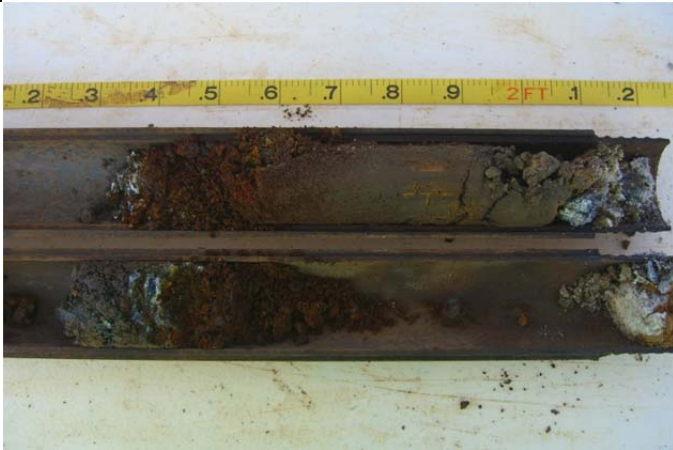


Official Photograph No. 55



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	5-6.1 ft
<b>Image No:</b>	MW-04(2)_5-7(1).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, dark red-brown (5YR 3/4) mottled (25%) with yellow (2.5Y 7/8), very stiff, moist.					

Official Photograph No. 56



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	6.4-7 ft
<b>Image No:</b>	MW-04(2)_5-7(2).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, strong brown (7.5YR 5/8) mottled (25%) with dark brown (7.5Y 3/4), very stiff, moist.					

Official Photograph No. 57



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	10-12 ft	<b>Depth Interval in Photo:</b>	10-10.9 ft
<b>Image No:</b>	MW-04(2)_10-12(1).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, strong brown (7.5YR 5/8) mottled (25%) with dark brown (7.5Y 3/4), very stiff, moist.					



Official Photograph No. 58



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	10-12 ft	<b>Depth Interval in Photo:</b>	10.6-11.5 ft
<b>Image No:</b>	MW-04(2)_10-12(2).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, strong brown (7.5YR 5/8) mottled (25%) with dark brown (7.5Y 3/4), very stiff, moist.					

Official Photograph No. 59



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	10-12 ft	<b>Depth Interval in Photo:</b>	10.8-11.5 ft
<b>Image No:</b>	MW-04(2)_10-12(4).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, strong brown (7.5YR 5/8) mottled (25%) with dark brown (7.5Y 3/4), very stiff, moist.					

Official Photograph No. 60



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	10-12 ft	<b>Depth Interval in Photo:</b>	11.5-12 ft
<b>Image No:</b>	MW-04(2)_10-12(3).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, strong brown (7.5YR 5/8) mottled (25%) with dark brown (7.5Y 3/4), very stiff, moist.					



Official Photograph No. 61



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	15-17 ft	<b>Depth Interval in Photo:</b>	15-16.1 ft
<b>Image No:</b>	MW-04(2)_15-17(1).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow brown (10YR 5/8) very stiff, dry & crumbly, laminated fabric.					

Official Photograph No. 62



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	15-17 ft	<b>Depth Interval in Photo:</b>	16.1-17 ft
<b>Image No:</b>	MW-04(2)_15-17(2).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow brown (10YR 5/8) very stiff, dry & crumbly, laminated fabric.					

Official Photograph No. 63



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	17-19 ft	<b>Depth Interval in Photo:</b>	17-17.9 ft
<b>Image No:</b>	MW-04(2)_17-19(1).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow brown (10YR 5/8) very stiff, dry & crumbly, laminated fabric.					

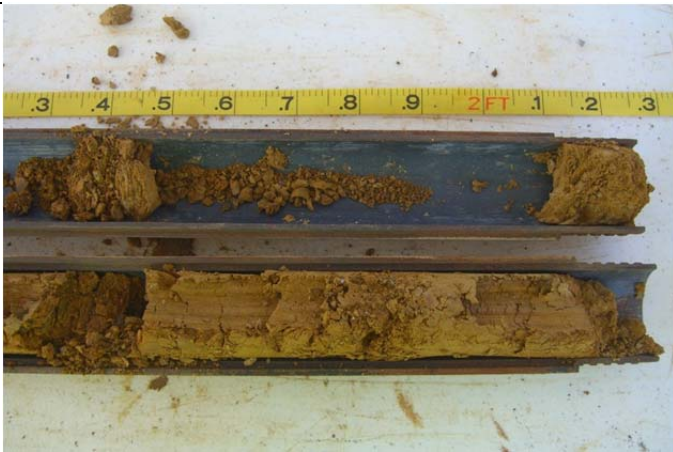


Official Photograph No. 64



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	17-19 ft	<b>Depth Interval in Photo:</b>	17.8-18.8 ft
<b>Image No:</b>	MW-04(2)_17-19(2).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow brown (10YR 5/8) very stiff, dry & crumbly, laminated fabric.					

Official Photograph No. 65



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	17-19 ft	<b>Depth Interval in Photo:</b>	18.3-19 ft
<b>Image No:</b>	MW-04(2)_17-19(3).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow brown (10YR 5/8) very stiff, dry & crumbly, laminated fabric.					

Official Photograph No. 66



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	19-21 ft	<b>Depth Interval in Photo:</b>	19-20.2 ft
<b>Image No:</b>	MW-04(2)_19-21(1).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow brown (10YR 5/8) very stiff, dry & crumbly, laminated fabric.					



Official Photograph No. 67



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	19-21 ft	<b>Depth Interval in Photo:</b>	20-21 ft
<b>Image No:</b>	MW-04(2)_19-21(2).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow brown (10YR 5/8) very stiff, dry & crumbly, laminated fabric.					

Official Photograph No. 68



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	21-23 ft	<b>Depth Interval in Photo:</b>	21-22 ft
<b>Image No:</b>	MW-04(2)_21-23(1).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow brown (10YR 5/8) very stiff, dry & crumbly, laminated fabric.					

Official Photograph No. 69



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	21-23 ft	<b>Depth Interval in Photo:</b>	22.2-23 ft
<b>Image No:</b>	MW-04(2)_21-23(2).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow brown (10YR 5/8) very stiff, dry & crumbly, laminated fabric.					



Official Photograph No. 70



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	25-27 ft	<b>Depth Interval in Photo:</b>	25-26 ft
<b>Image No:</b>	MW-04(2)_25-27(1).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, dark yellow-brown (10YR 4/6) mottled (25%) with black, very soft.					

Official Photograph No. 71



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	25-27 ft	<b>Depth Interval in Photo:</b>	25.2-27 ft
<b>Image No:</b>	MW-04(2)_25-27(2).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, dark yellow-brown (10YR 4/6) mottled (25%) with black, very soft.					

Official Photograph No. 72



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	25-27 ft	<b>Depth Interval in Photo:</b>	26-26.7 ft
<b>Image No:</b>	MW-04(2)_25-27(3).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, dark yellow-brown (10YR 4/6) mottled (25%) with black, very soft.					

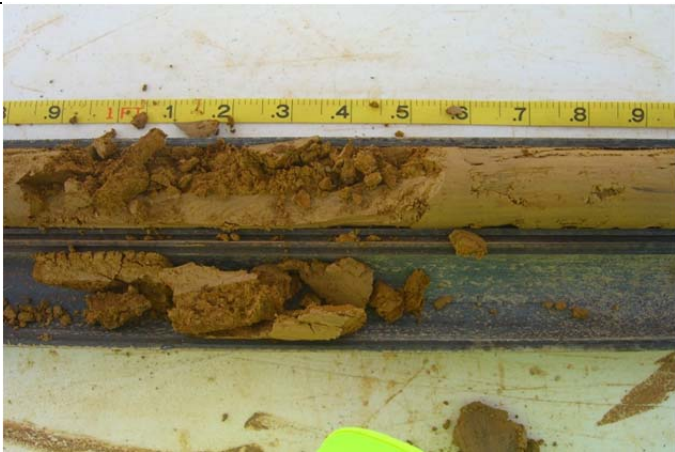


Official Photograph No. 73



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	30-32 ft	<b>Depth Interval in Photo:</b>	30-31 ft
<b>Image No:</b>	MW-04(2)_30-32(1).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow brown (10YR 5/8) very stiff, dry & crumbly, laminated fabric.					

Official Photograph No. 74



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	30-32 ft	<b>Depth Interval in Photo:</b>	30.9-31.9 ft
<b>Image No:</b>	MW-04(2)_30-32(2).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow brown (10YR 5/8) very stiff, dry & crumbly, laminated fabric.					

Official Photograph No. 75



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	30-32 ft	<b>Depth Interval in Photo:</b>	31.2-32 ft
<b>Image No:</b>	MW-04(2)_30-32(3).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow brown (10YR 5/8) very stiff, dry & crumbly, laminated fabric.					



Official Photograph No. 76



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	35-37 ft	<b>Depth Interval in Photo:</b>	35-35.9 ft
<b>Image No:</b>	MW-04(2)_35-37(1).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY with chert GRAVEL, yellow brown (10YR 5/8) very stiff, dry & crumbly, slightly plastic, laminated fabric.					

Official Photograph No. 77



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	35-37 ft	<b>Depth Interval in Photo:</b>	35.7-36.5 ft
<b>Image No:</b>	MW-04(2)_35-37(2).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY with chert GRAVEL, yellow brown (10YR 5/8) very stiff, dry & crumbly, slightly plastic, laminated fabric.					

Official Photograph No. 78



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	35-37 ft	<b>Depth Interval in Photo:</b>	36.3-37 ft
<b>Image No:</b>	MW-04(2)_35-37(3).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY with chert GRAVEL, yellow brown (10YR 5/8) very stiff, dry & crumbly, slightly plastic, laminated fabric.					



Official Photograph No. 79



<b>Boring No:</b>	MW-04(2)	<b>Split Spoon:</b>	40-42 ft	<b>Depth Interval in Photo:</b>	41-42 ft
<b>Image No:</b>	MW-04(2)_40-42(2).JPG			<b>Date:</b>	5/21/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-04A via hollow stem auger drilling techniques. Lithologic description: CLAY with chert GRAVEL, yellow brown (10YR 5/8) very stiff, dry & crumbly, slightly plastic, laminated fabric.					



Official Photograph No. 80



<b>Boring No:</b>	MW-05	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	5-5.9 ft
<b>Image No:</b>	MW-05_5-7_ft(1).JPG			<b>Date:</b>	5/18/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow-red (5YR 4/6) mottled (25%) with brown-yellow (10YR 6/8) stiff, dry and WASTE (Anthropogenic fill),black granular salt cake, NH3 =>200 ppm.					

Official Photograph No. 81



<b>Boring No:</b>	MW-05	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	5.4-6.6 ft
<b>Image No:</b>	MW-05_5-7_ft(2).JPG			<b>Date:</b>	5/18/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow-red (5YR 4/6) mottled (25%) with brown-yellow (10YR 6/8) stiff, dry and WASTE (Anthropogenic fill),black granular salt cake, NH3 =>200 ppm.					

Official Photograph No. 82



<b>Boring No:</b>	MW-05	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	6.2-7 ft
<b>Image No:</b>	MW-05_5-7_ft(3).JPG			<b>Date:</b>	5/18/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: CLAY, yellow-red (5YR 4/6) mottled (25%) with brown-yellow (10YR 6/8) stiff, dry and WASTE (Anthropogenic fill),black granular salt cake, NH3 =>200 ppm.					



Official Photograph No. 83



<b>Boring No:</b>	MW-05	<b>Split Spoon:</b>	10-12 ft	<b>Depth Interval in Photo:</b>	11.3-12 ft
<b>Image No:</b>	MW-05_10-12_ft.JPG			<b>Date:</b>	5/18/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: CLAY with chert, strong brown (7.5YR 5/8), very stiff, moderately plastic, moist, HN3 = 60 ppm.					

Official Photograph No. 84



<b>Boring No:</b>	MW-05	<b>Split Spoon:</b>	15-17 ft	<b>Depth Interval in Photo:</b>	15-16.3 ft
<b>Image No:</b>	MW-05_15-17_ft(1).JPG			<b>Date:</b>	5/25/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: CLAY with chert, strong brown (7.5YR 5/8), very stiff, moderately plastic, moist, HN3 = 60 ppm.					

Official Photograph No. 85



<b>Boring No:</b>	MW-05	<b>Split Spoon:</b>	15-17 ft	<b>Depth Interval in Photo:</b>	16.6-17 ft
<b>Image No:</b>	MW-05_15-17_ft(3).JPG			<b>Date:</b>	5/25/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: SILTY CLAY with GRAVEL, strong brown (7.5YR 5/8), soft, plastic, moist.					



Official Photograph No. 86



<b>Boring No:</b>	MW-05	<b>Split Spoon:</b>	17-19 ft	<b>Depth Interval in Photo:</b>	17-18 ft
<b>Image No:</b>	MW-05_17-19_ft(1).JPG			<b>Date:</b>	5/25/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: SILTY CLAY with GRAVEL, strong brown (7.5YR 5/8), soft, plastic, moist.					

Official Photograph No. 87



<b>Boring No:</b>	MW-05	<b>Split Spoon:</b>	17-19 ft	<b>Depth Interval in Photo:</b>	18-19 ft
<b>Image No:</b>	MW-05_17-19_ft(2).JPG			<b>Date:</b>	5/25/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: SILTY CLAY with GRAVEL, strong brown (7.5YR 5/8), soft, plastic, moist.					



Official Photograph No. 88



<b>Boring No:</b>	MW-07(1)	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	6-7 ft
<b>Image No:</b>	MW-07(1)_5-7_ft(2).JPG			<b>Date:</b>	5/18/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: CLAY, dark olive-brown (2.5Y 3/3) mottled (25%) with olive-yellow (2.5Y 6/8), very stiff, slightly plastic, dry and WASTE (Anthropogenic Fill), wood, rubber, concrete.					



Official Photograph No. 89



<b>Boring No:</b>	MW-07(2)	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	5-6 ft
<b>Image No:</b>	MW-07(2)_5-7_ft(1).JPG			<b>Date:</b>	5/18/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: CLAY, dark red (2.5 YR 3/6), very stiff, dry					

Official Photograph No. 90



<b>Boring No:</b>	MW-07(2)	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	6-7 ft
<b>Image No:</b>	MW-07(2)_5-7_ft(2).JPG			<b>Date:</b>	5/18/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: CLAY, dark red (2.5 YR 3/6), very stiff, dry and WASTE (Anthropogenic fill), black, granular, ammonia odor.					



Official Photograph No. 91



<b>Boring No:</b>	MW-07A	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	6-7 ft
<b>Image No:</b>	MW-07(N)_5-7_ft.JPG			<b>Date:</b>	5/22/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-07A via hollow stem auger drilling techniques. Lithologic description: CLAY, strong brown (7.5YR 5/8) stiff, dry, laminated fabric.					

Official Photograph No. 92



<b>Boring No:</b>	MW-07A	<b>Split Spoon:</b>	10-12 ft	<b>Depth Interval in Photo:</b>	10-11 ft
<b>Image No:</b>	MW-07(N)_10-12_ft(1).JPG			<b>Date:</b>	5/22/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-07A via hollow stem auger drilling techniques. Lithologic description: CLAY, strong brown (7.5YR 5/8) stiff, dry, laminated fabric.					

Official Photograph No. 93



<b>Boring No:</b>	MW-07A	<b>Split Spoon:</b>	10-12 ft	<b>Depth Interval in Photo:</b>	11-12 ft
<b>Image No:</b>	MW-07(N)_10-12_ft(2).JPG			<b>Date:</b>	5/22/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-07A via hollow stem auger drilling techniques. Lithologic description: CLAY, strong brown (7.5YR 5/8) stiff, dry, laminated fabric.					



Official Photograph No. 94



<b>Boring No:</b>	MW-07A	<b>Split Spoon:</b>	10-12 ft	<b>Depth Interval in Photo:</b>	11.1-12 ft
<b>Image No:</b>	MW-07(N)_10-12_ft(3).JPG			<b>Date:</b>	5/22/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-07A via hollow stem auger drilling techniques. Lithologic description: CLAY, strong brown (7.5YR 5/8) stiff, dry, laminated fabric.					

Official Photograph No. 95



<b>Boring No:</b>	MW-07A	<b>Split Spoon:</b>	15-17 ft	<b>Depth Interval in Photo:</b>	15-16.1 ft
<b>Image No:</b>	MW-07(N)_15-17_ft(1).JPG			<b>Date:</b>	5/22/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-07A via hollow stem auger drilling techniques. Lithologic description: SANDY CLAY with GRAVEL, strong brown (7.5YR 6/8), very soft, moist.					

Official Photograph No. 96



<b>Boring No:</b>	MW-07A	<b>Split Spoon:</b>	15-17 ft	<b>Depth Interval in Photo:</b>	16-17 ft
<b>Image No:</b>	MW-07(N)_15-17_ft(2).JPG			<b>Date:</b>	5/22/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-07A via hollow stem auger drilling techniques. Lithologic description: SANDY CLAY with GRAVEL, strong brown (7.5YR 6/8), very soft, moist.					

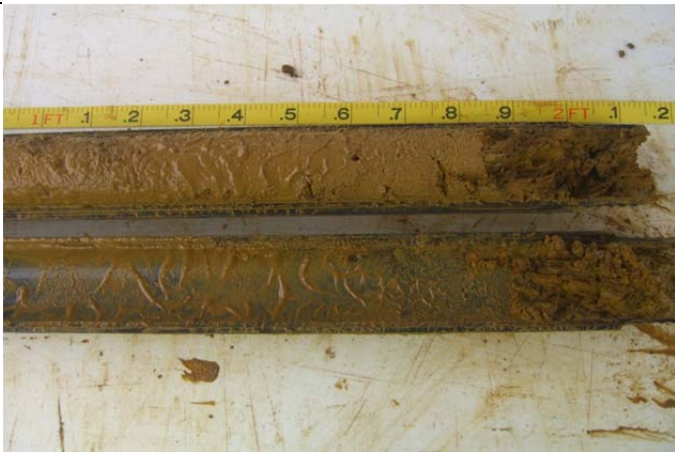


Official Photograph No. 97



<b>Boring No:</b>	MW-07A	<b>Split Spoon:</b>	20-22 ft	<b>Depth Interval in Photo:</b>	20-21 ft
<b>Image No:</b>	MW-07(N)_20-22_ft(1).JPG			<b>Date:</b>	5/22/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-07A via hollow stem auger drilling techniques. Lithologic description: SANDY CLAY with angular cherty GRAVEL, strong brown (7.5YR 6/8) stiff, slightly plastic, moist.					

Official Photograph No. 98



<b>Boring No:</b>	MW-07A	<b>Split Spoon:</b>	20-22 ft	<b>Depth Interval in Photo:</b>	21-22 ft
<b>Image No:</b>	MW-07(N)_20-22_ft(2).JPG			<b>Date:</b>	5/22/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-07A via hollow stem auger drilling techniques. Lithologic description: SANDY CLAY with angular cherty GRAVEL, strong brown (7.5YR 6/8) stiff, slightly plastic, moist.					

Official Photograph No. 99



<b>Boring No:</b>	MW-07A	<b>Split Spoon:</b>	25-27 ft	<b>Depth Interval in Photo:</b>	26-27 ft
<b>Image No:</b>	MW-07(N)_25-27_ft.JPG			<b>Date:</b>	5/22/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-07A via hollow stem auger drilling techniques. Lithologic description: SANDY CLAY with dolomitic GRAVEL, strong brown (7.5YR 6/8) very soft, moist and LIMESTONE, grey and white, crystalline, dolomitic.					

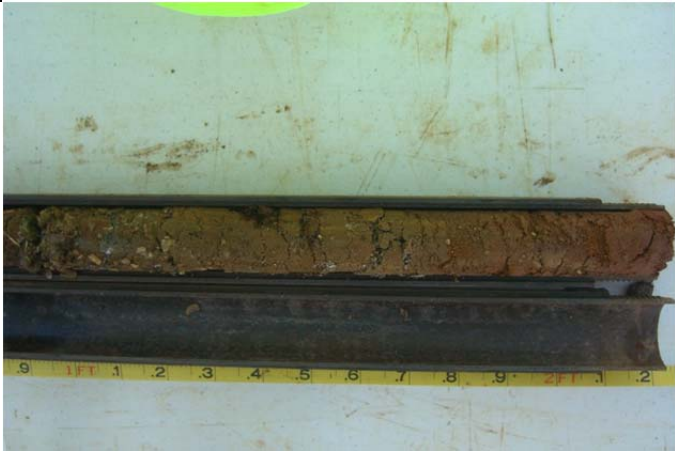


Official Photograph No. 100



<b>Boring No:</b>	MW-08	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	6-7 ft
<b>Image No:</b>	MW-08_5-7_ft_(1).JPG			<b>Date:</b>	5/17/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-08A via hollow stem auger drilling techniques. Lithologic description: CLAY, red (2.5YR 4/8) mottled (25%) with brown-yellow (10YR 6/8), very stiff, dry.					

Official Photograph No. 101



<b>Boring No:</b>	MW-08	<b>Split Spoon:</b>	10-12 ft	<b>Depth Interval in Photo:</b>	11-12 ft
<b>Image No:</b>	MW-08_10-12_ft_(2).JPG			<b>Date:</b>	5/17/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-08A via hollow stem auger drilling techniques. Lithologic description: SANDY CLAY, yellow-red (5YR 5/6), soft, slightly plastic, moist.					

Official Photograph No. 102



<b>Boring No:</b>	MW-08	<b>Split Spoon:</b>	15-17 ft	<b>Depth Interval in Photo:</b>	15-16 ft
<b>Image No:</b>	MW-08_15-17_ft_(1).JPG			<b>Date:</b>	5/17/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-08A via hollow stem auger drilling techniques. Lithologic description: SANDY CLAY with chert GRAVEL, dark red (2.5YR 3/6) soft, plastic, moist.					



Official Photograph No. 103



<b>Boring No:</b>	MW-08	<b>Split Spoon:</b>	15-17 ft	<b>Depth Interval in Photo:</b>	16-17 ft
<b>Image No:</b>	MW-08_15-17_ft_(2).JPG			<b>Date:</b>	5/17/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-08A via hollow stem auger drilling techniques. Lithologic description: SANDY CLAY with chert GRAVEL, dark red (2.5YR 3/6) soft, plastic, moist.					

Official Photograph No. 104



<b>Boring No:</b>	MW-08	<b>Split Spoon:</b>	20-22 ft	<b>Depth Interval in Photo:</b>	20-21 ft
<b>Image No:</b>	MW-08_20-22_ft_(1).JPG			<b>Date:</b>	5/17/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-08A via hollow stem auger drilling techniques. Lithologic description: SANDY CLAY with chert GRAVEL, dark yellow-brown (10YR 4/6) very soft, nonplastic, very moist.					

Official Photograph No. 105



<b>Boring No:</b>	MW-08	<b>Split Spoon:</b>	20-22 ft	<b>Depth Interval in Photo:</b>	21.1-22 ft
<b>Image No:</b>	MW-08_20-22_ft_(3).JPG			<b>Date:</b>	5/17/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-08A via hollow stem auger drilling techniques. Lithologic description: SANDY CLAY with chert GRAVEL, dark yellow-brown (10YR 4/6) very soft, nonplastic, very moist.					



Official Photograph No. 106



<b>Boring No:</b>	MW-08	<b>Split Spoon:</b>	25-27 ft	<b>Depth Interval in Photo:</b>	shoe
<b>Image No:</b>	MW-08_25-27_ft.JPG			<b>Date:</b>	5/17/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-08A via hollow stem auger drilling techniques. Lithologic description: CLAY with GRAVEL, brown, (10YR 4/3), very soft, nonplastic, moist.					

Official Photograph No. 107



<b>Boring No:</b>	MW-08	<b>Split Spoon:</b>	30-32 ft	<b>Depth Interval in Photo:</b>	30-31 ft
<b>Image No:</b>	MW-08_30-32_ft_(1).JPG			<b>Date:</b>	5/17/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-08A via hollow stem auger drilling techniques. Lithologic description: SANDY CLAY with angular GRAVEL, brown (10YR 4/3), very soft, very moist.					

Official Photograph No. 108



<b>Boring No:</b>	MW-08	<b>Split Spoon:</b>	30-32 ft	<b>Depth Interval in Photo:</b>	31-32 ft
<b>Image No:</b>	MW-08_30-32_ft_(2).JPG			<b>Date:</b>	5/17/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-08A via hollow stem auger drilling techniques. Lithologic description: SANDY CLAY with angular GRAVEL, brown (10YR 4/3), very soft, very moist.					



Official Photograph No. 109



<b>Boring No:</b>	MW-08	<b>Split Spoon:</b>	35-37 ft	<b>Depth Interval in Photo:</b>	35-36 ft
<b>Image No:</b>	MW-08_35-37_ft_(1).JPG			<b>Date:</b>	5/17/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-08A via hollow stem auger drilling techniques. Lithologic description: SANDY CLAY with angular GRAVEL, dark yellow-brown (10YR 3/6), very soft, slightly plastic, very moist.					

Official Photograph No. 110



<b>Boring No:</b>	MW-08	<b>Split Spoon:</b>	35-37 ft	<b>Depth Interval in Photo:</b>	36-37 ft
<b>Image No:</b>	MW-08_35-37_ft_(2).JPG			<b>Date:</b>	5/17/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-08A via hollow stem auger drilling techniques. Lithologic description: SANDY CLAY with angular GRAVEL, dark yellow-brown (10YR 3/6), very soft, slightly plastic, very moist.					



Official Photograph No. 111



<b>Boring No:</b>	MW-09	<b>Split Spoon:</b>	10-12 ft	<b>Depth Interval in Photo:</b>	10-12 ft
<b>Image No:</b>	MW-09_10-12_ft.JPG			<b>Date:</b>	5/14/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: GRAVELY CLAY, brown (7.5YR 4/4), slightly plastic, moist.					

Official Photograph No. 112



<b>Boring No:</b>	MW-09	<b>Split Spoon:</b>	15-17 ft	<b>Depth Interval in Photo:</b>	15-17 ft
<b>Image No:</b>	MW-09_15-17_ft(1).JPG			<b>Date:</b>	5/14/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: CLAY, mottled dark yellow-brown, very stiff, slightly plastic, dry.					

Official Photograph No. 113



<b>Boring No:</b>	MW-09	<b>Split Spoon:</b>	20-22 ft	<b>Depth Interval in Photo:</b>	20-22 ft
<b>Image No:</b>	MW-09_20-22_ft(1).JPG			<b>Date:</b>	5/14/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: CLAY, mottled dark yellow-brown, very stiff, slightly plastic, dry and CLAY, as above, with fragments of dolomitic LIMESTONE.					



Official Photograph No. 114



<b>Boring No:</b>	MW-10	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	5-7 ft
<b>Image No:</b>	MW-10_5-7_ft(1).JPG			<b>Date:</b>	5/14/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-10A via hollow stem auger drilling techniques. Lithologic description: CLAY, mottled strong brown (7.5YR 5/8), very stiff, slightly plastic, dry, layered fabric.					

Official Photograph No. 115



<b>Boring No:</b>	MW-10	<b>Split Spoon:</b>	10-12 ft	<b>Depth Interval in Photo:</b>	10-12 ft
<b>Image No:</b>	MW-10_10-12_ft(1).JPG			<b>Date:</b>	5/14/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-10A via hollow stem auger drilling techniques. Lithologic description: CLAY, strong brown (7.5YR 5/8), very stiff, slightly plastic, dry, layered fabric.					

Official Photograph No. 116



<b>Boring No:</b>	MW-10	<b>Split Spoon:</b>	15-17 ft	<b>Depth Interval in Photo:</b>	15-17 ft
<b>Image No:</b>	MW-10_15-17_ft.JPG			<b>Date:</b>	5/14/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-10A via hollow stem auger drilling techniques. Lithologic description: CLAY, mottled strong brown (7.5YR 4/6), very stiff, slightly plastic, dry.					



Official Photograph No. 117



<b>Boring No:</b>	MW-10	<b>Split Spoon:</b>	20-22 ft	<b>Depth Interval in Photo:</b>	20-22 ft
<b>Image No:</b>	MW-10_20-22_ft(1).JPG			<b>Date:</b>	5/14/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-10A via hollow stem auger drilling techniques. Lithologic description: CLAY with 10% chert GRAVEL, dark red (2.5YR 3/6), grades from stiff to soft and from dry to very moist with increasing depth.					

Official Photograph No. 118



<b>Boring No:</b>	MW-10	<b>Split Spoon:</b>	25-27 ft	<b>Depth Interval in Photo:</b>	25-26.9 ft
<b>Image No:</b>	MW-10_25-27_ft.JPG			<b>Date:</b>	5/14/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-10A via hollow stem auger drilling techniques. Lithologic description: CLAY with 10% chert GRAVEL, dark red (2.5YR 3/6), grades from stiff to soft and from dry to very moist with increasing depth.					

Official Photograph No. 119



<b>Boring No:</b>	MW-10	<b>Split Spoon:</b>	30-32 ft	<b>Depth Interval in Photo:</b>	30-31.7 ft
<b>Image No:</b>	MW-10_30-32_ft(1).JPG			<b>Date:</b>	5/14/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled during the installation of groundwater monitoring well MW-10A via hollow stem auger drilling techniques. Lithologic description: CLAY with chert GRAVEL, yellow-brown (10YR 5/8), very stiff, dry.					



Official Photograph No. 120



<b>Boring No:</b>	MW-11(1)	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	6-7 ft
<b>Image No:</b>	MW-11(1)_5-7_ft.JPG			<b>Date:</b>	6/01/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: CLAY, dark brown (7.5YR 3/4), very soft, moist and WASTE (Anthropogenic Fill), concrete, steel.					



Official Photograph No. 121



<b>Boring No:</b>	MW-11(2)	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	5-6 ft
<b>Image No:</b>	MW-11(2)5-7_ft(1).JPG			<b>Date:</b>	6/01/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: CLAY with WASTE (concrete and aluminum), strong brown (7.5YR 4/6).					

Official Photograph No. 122



<b>Boring No:</b>	MW-11(2)	<b>Split Spoon:</b>	5-7 ft	<b>Depth Interval in Photo:</b>	6-7 ft
<b>Image No:</b>	MW-11(2)5-7_ft(2).JPG			<b>Date:</b>	6/01/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: CLAY with WASTE (concrete and aluminum), strong brown (7.5YR 4/6).					

Official Photograph No. 123



<b>Boring No:</b>	MW-11(2)	<b>Split Spoon:</b>	7-9 ft	<b>Depth Interval in Photo:</b>	8-9 ft
<b>Image No:</b>	MW-11(2)7-9_ft(2).JPG			<b>Date:</b>	6/01/2012
<b>Photographer:</b> Janna Peevler-Boyd, Tetra Tech, Inc.				<b>Time:</b>	NA
<b>Subject:</b> Split spoon soil core sampled via hollow stem auger drilling techniques. Lithologic description: CLAY with WASTE (concrete and aluminum), strong brown (7.5YR 4/6).					



**J.M. Waller Associates, Inc.**

**Remedial Action Contract II Lite, Region IV, Photo Log**

<b>Contract:</b>	EP-S4-08-03	<b>Site Name:</b>	Smokey Mountain Smelters
<b>Task No.:</b>	019	<b>Date:</b>	May 2012
<b>RPM:</b>	Rusty Kestle	<b>Project Mgt.:</b>	Janice Austin
<b>PHOTO LOG</b>			

--	--	--	--

<b>ACKNOWLEDGEMENTS</b>			
<b>SIGNATURE</b>		<b>PM SIGNATURE</b>	
<b>Date:</b>		<b>Date:</b>	





**OFFICIAL PHOTOGRAPH NO.: 1**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Center of SMS site	<b>Date:</b>	May 10, 2012
<b>Photo Number:</b>	DSCI0071	<b>Time:</b>	1105
<b>Orientation:</b>	South		
<b>Photographer:</b>	Terence Chuhay, J. M. Waller Associates		
<b>Subject:</b>	View of newly constructed gravel road leading to proposed well/boring locations: MW03, MW04, MW05, and MW06.		





**OFFICIAL PHOTOGRAPH NO.: 2**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Northeast portion of SMS site	<b>Date:</b>	May 10, 2012
<b>Photo Number:</b>	DSCI0074	<b>Time:</b>	1140
<b>Orientation:</b>	Northeast		
<b>Photographer:</b>	Terence Chuhay, J. M. Waller Associates		
<b>Subject:</b>	View of newly constructed gravel road leading to proposed monitor well/boring locations: MW10A and MW10B. (Grass was mowed soon after this photo was taken.)		





**OFFICIAL PHOTOGRAPH NO.: 3**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Center of SMS site	<b>Date:</b>	May 10, 2012
<b>Photo Number:</b>	DSCI0075	<b>Time:</b>	1141
<b>Orientation:</b>	East southeast		
<b>Photographer:</b>	Terence Chuhay, J. M. Waller Associates		
<b>Subject:</b>	View of newly placed gravel road to proposed monitor well/boring locations MW01 and MW02.		





**OFFICIAL PHOTOGRAPH NO.: 4**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Center of SMS Site	<b>Date:</b>	May 14, 2012
<b>Photo Number:</b>	DSCI0076	<b>Time:</b>	1642
<b>Orientation:</b>	West		
<b>Photographer:</b>	Terence Chuhay, J. M. Waller Associates		
<b>Subject:</b>	View of Investigative Derived Waste management area. View of 20 yard roll-off on left, auger rig decontamination pad in center, and vertical plastic 6900 gallon tank for wastewater.		



Official Photograph No. 1



<b>Boring No:</b>	MW-11B	<b>Depth Interval</b>	0-5 ft	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1474.jpg			<b>Time:</b>	16:41
<b>Photographer:</b>		Matt Miller			
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-11B. Core contains silty and sandy clay, with inclusions of shale.</p>					

Official Photograph No. 2



<b>Boring No:</b>	MW-11B	<b>Depth Interval</b>	5-10 ft.	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1476.jpg			<b>Time:</b>	16:50
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-11B. Core contains silty and sandy clay, with inclusions of shale.</p>					

Official Photograph No. 3



<b>Boring No:</b>	MW-11B	<b>Depth Interval</b>	10-15 ft.	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1478.jpg			<b>Time:</b>	16:56
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-11B. Core contains silty and sandy clay, with inclusions of shale.</p>					



Official Photograph No. 4



<b>Boring No:</b>	MW-11B	<b>Depth Interval</b>	15-20 ft.	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1480.jpg			<b>Time:</b>	17:03
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-11B. Core contains silty and sandy clay, with inclusions of shale.</p>					

Official Photograph No. 5



<b>Boring No:</b>	MW-11B	<b>Depth Interval</b>	20-25 ft.	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1482.jpg			<b>Time:</b>	17:12
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-11B. Core contains weathered of shale and sandstone and fragmented limestone.</p>					

Official Photograph No. 6



<b>Boring No:</b>	MW-11B	<b>Depth Interval</b>	25-30 ft.	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1487.jpg			<b>Time:</b>	17:29
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-11B. Core contains weathered of shale and sandstone and fragmented limestone.</p>					



Official Photograph No. 7



<b>Boring No:</b>	MW-11B	<b>Depth Interval</b>	25-30 ft.	<b>Date:</b>	5/28/2013
<b>Image No:</b>	IMAG1559.jpg			<b>Time:</b>	13:59
<b>Photographer:</b>		Matt Miller			
<p><b>Subject:</b> 3.25" ID rock core bit cuttings obtained during the installation of groundwater monitoring well MW-11B. Semi-consolidated nature of lithology prohibited direct push sampling, but was soft enough prohibit obtaining good core samples. These cuttings are representative of the weathered sandstone and shale with inclusions of sandy limestone encountered to approximately 37 ft depth.</p>					

Official Photograph No. 8



<b>Boring No:</b>	MW-11B	<b>Depth Interval</b>	37-42 ft.	<b>Date:</b>	5/30/2013
<b>Image No:</b>	IMAG1593.jpg			<b>Time:</b>	14:29
<b>Photographer:</b>		Matt Miller			
<p><b>Subject:</b> 2.5" rock core obtained during the installation of groundwater monitoring well MW-11B. The core contains sandy limestone grading to sandstone. Note relic bedding and bedding parallel stylolites.</p>					

Official Photograph No. 9



<b>Boring No:</b>	MW-11B	<b>Depth Interval</b>	42-44 ft.	<b>Date:</b>	5/30/2013
<b>Image No:</b>	IMAG1594.jpg			<b>Time:</b>	14:40
<b>Photographer:</b>		Matt Miller			
<p><b>Subject:</b> 2.5" rock core (uppermost core in photograph) obtained during the installation of groundwater monitoring well MW-11B.. The core contains sandy limestone grading to sandstone. Note relic bedding and bedding parallel stylolites.</p>					



Official Photograph No. 10



<b>Boring No:</b>	MW-11B	<b>Depth Interval</b>	44-49 ft.	<b>Date:</b>	5/30/2013
<b>Image No:</b>	IMAG1595.jpg			<b>Time:</b>	14:46
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> 2.5" rock core (uppermost core in photograph) obtained during the installation of groundwater monitoring well MW-11B. The core contains sandy limestone grading to sandstone. Note relic bedding, calcitic vein fill, and iron oxide stained fractures.</p>					

Official Photograph No. 11



<b>Boring No:</b>	MW-11B	<b>Depth Interval</b>	49-54 ft.	<b>Date:</b>	5/30/2013
<b>Image No:</b>	IMAG1598.jpg			<b>Time:</b>	14:51
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> 2.5" rock core (uppermost core in photograph) obtained during the installation of groundwater monitoring well MW-11B. The core contains sandy limestone grading to sandstone. Note relic bedding, calcitic vein fill, and iron oxide stained fractures.</p>					

Official Photograph No. 12



<b>Boring No:</b>	MW-11B	<b>Depth Interval</b>	54-57 ft.	<b>Date:</b>	5/30/2013
<b>Image No:</b>	IMAG1601.jpg			<b>Time:</b>	15:23
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> 2.5" rock core (uppermost core in photograph) obtained during the installation of groundwater monitoring well MW-11B. The core contains sandy limestone grading to sandstone. Note relic bedding, calcitic vein fill, and iron oxide stained fractures.</p>					



Official Photograph No. 13



<b>Boring No:</b>	MW-11B	<b>Depth Interval</b>	~50 ft	<b>Date:</b>	5/30/2013
<b>Image No:</b>	IMAG1597.jpg			<b>Time:</b>	14:46
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> 2.5” rock core obtained from approximately 50 ft depth during the installation of groundwater monitoring well MW-11B. This photograph highlights the features of the screened groundwater production zone in the bedrock at MW-11B. Note the relic bedding with evidence of pressure solution parallel to bedding, fracturing and calcite vein fill discordant to bedding, evidence of slip along bedding planes in the form of truncated calcite veins, and open fractures (iron oxide staining) contrasting with drilling induced fractures (left of image). Groundwater migration along open fractures is recorded by iron oxide staining in open fractures.</p>					



Official Photograph No. 14



<b>Boring No:</b>	MW-12A/B	<b>Depth Interval</b>	5-10 ft	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1437.jpg			<b>Time:</b>	13:57
<b>Photographer:</b>		Matt Miller			
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-12A/B. Core contains silty and sandy clay, with inclusions of shale.</p>					

Official Photograph No. 15



<b>Boring No:</b>	MW-12A/B	<b>Depth Interval</b>	10-15 ft	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1439.jpg			<b>Time:</b>	14:04
<b>Photographer:</b>		Matt Miller			
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-12A/B. Core contains silty and sandy clay, with inclusions of shale.</p>					

Official Photograph No. 16



<b>Boring No:</b>	MW-12A/B	<b>Depth Interval</b>	15-20 ft	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1441.jpg			<b>Time:</b>	14:11
<b>Photographer:</b>		Matt Miller			
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-12A/B. Core contains silty and sandy clay, with inclusions of shale.</p>					



Official Photograph No. 17



<b>Boring No:</b>	MW-12A/B	<b>Depth Interval</b>	20-25 ft	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1444.jpg			<b>Time:</b>	14:23
<b>Photographer:</b>		Matt Miller			
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-12A/B. Core contains silty and sandy clay, with inclusions of shale.</p>					

Official Photograph No. 18



<b>Boring No:</b>	MW-12A/B	<b>Depth Interval</b>	25-28 ft	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1448.jpg			<b>Time:</b>	14:36
<b>Photographer:</b>		Matt Miller			
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-12A/B. Core contains silty and sandy clay, with inclusions of shale.</p>					

Official Photograph No. 19



<b>Boring No:</b>	MW-12A/B	<b>Depth Interval</b>	~28 ft	<b>Date:</b>	5/30/2013
<b>Image No:</b>	IMAG1449.jpg			<b>Time:</b>	14:37
<b>Photographer:</b>		Matt Miller			
<p><b>Subject:</b> Shale and limestone fragments contained in Geoprobe Macrocore (direct push) soil core sample obtained at the weathered shale/limestone contact at approximately 28 ft depth during the installation of groundwater monitoring well MW-12A/B.</p>					



Official Photograph No. 20



<b>Boring No:</b>	MW-12A	<b>Depth Interval</b>	28-31 ft	<b>Date:</b>	5/21/2013
<b>Image No:</b>	IMAG1444.jpg			<b>Time:</b>	16:05
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> 3.25" rock core obtained during the installation of groundwater monitoring well MW-12A. Note brecciation, weathered open fractures with iron oxide staining, and calcite vein fill.</p>					

Official Photograph No. 21



Boring No:	MW-12A	Depth Interval	31-34 ft	Date:	5/21/2013
Image No:	IMAG1503.jpg			Time:	18:01
Photographer:	Matt Miller				
<p><b>Subject:</b> 3.25" rock core bit obtained during the installation of groundwater monitoring well MW-12A. Core recovery was near 100%, absence of rock due to void (karst or fault) encountered at 33-34 ft depth.</p>					

Official Photograph No. 22



<b>Boring No:</b>	MW-12A	<b>Depth Interval</b>	34-39 ft	<b>Date:</b>	5/22/2013
<b>Image No:</b>	IMAG1510.jpg			<b>Time:</b>	10:13
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> 3.25" rock core obtained during the installation of groundwater monitoring well MW-12A. MW-12A was installed to be screened through the void in (Official Photograph 21) and the fracture network pictured here.</p>					



Official Photograph No. 23



<b>Boring No:</b>	MW-12B	<b>Depth Interval</b>	42-44 ft	<b>Date:</b>	5/29/2013
<b>Image No:</b>	IMAG1580.jpg			<b>Time:</b>	12:22
<b>Photographer:</b>		Matt Miller			
<p><b>Subject:</b> 2.5" rock core obtained during the installation of groundwater monitoring well MW-12B. Note brecciation, and calcite vein fill. Recovery 40-42 feet limited to only rock fragments due to excessive fracturing. Assumed similar lithology based on fragment lithology and driller's description of formation continuity/hardness</p>					

Official Photograph No. 24



Boring No:	MW-12B	Depth Interval	44-49 ft	Date:	5/29/2013
Image No:	IMAG1582.jpg			Time:	13:34
Photographer:	Matt Miller				
<p><b>Subject:</b> 2.5" rock core obtained during the installation of groundwater monitoring well MW-12B. Note brecciation and iron oxide filled staining in open fractures.</p>					

Official Photograph No. 25



Boring No:	MW-12B	Depth Interval	49-54 ft	Date:	5/29/2013
Image No:	IMAG1583.jpg			Time:	14:02
Photographer:	Matt Miller				
<p><b>Subject:</b> 2.5" rock core obtained during the installation of groundwater monitoring well MW-12B. Note brecciation.</p>					



Official Photograph No. 26



<b>Boring No:</b>	MW-12B	<b>Depth Interval</b>	54-59 ft	<b>Date:</b>	5/29/2013
<b>Image No:</b>	IMAG1585.jpg			<b>Time:</b>	12:44
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> 2.5" rock core obtained during the installation of groundwater monitoring well MW-12B. Note brecciation, iron oxide staining in open fractures, and calcite vein fill.</p>					

Official Photograph No. 27



Boring No:	MW-12B	Depth Interval	59-62 ft	Date:	5/29/2013
Image No:	IMAG1590.jpg			Time:	15:21
Photographer:	Matt Miller				
<p><b>Subject:</b> 2.5" rock core obtained during the installation of groundwater monitoring well MW-12B. Note extensive iron oxide staining present in calcitic slickensided fractures/small faults within this brecciated limestone.</p>					

Official Photograph No. 28



<b>Boring No:</b>	MW-12B	<b>Depth Interval</b>	59-62 ft	<b>Date:</b>	5/29/2013
<b>Image No:</b>	IMAG1591.jpg			<b>Time:</b>	15:21
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> Close up of fracture in Official Photograph No. 27. This photograph highlights the features of the screened groundwater production zone in the bedrock at MW-12B. The mineralogy is likely goethite and hematite and possibly pyrolusite (small spheroidal to dendritic stains) within a slickensided calcite filled fracture, given the streaks produced by, and the crystal habits displayed by, this sample.</p>					



Official Photograph No. 29



<b>Boring No:</b>	MW-13A/B	<b>Depth Interval</b>	0-5 ft	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1451.jpg			<b>Time:</b>	15:00
<b>Photographer:</b>		Matt Miller			
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-13A/B. Core contains silty and sandy clay, and cement/rock fill.</p>					

Official Photograph No. 30



<b>Boring No:</b>	MW-13A/B	<b>Depth Interval</b>	5-10 ft	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1454.jpg			<b>Time:</b>	15:11
<b>Photographer:</b>		Matt Miller			
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-13A/B. Core contains silty and sandy clay, with inclusions of shale.</p>					

Official Photograph No. 31



<b>Boring No:</b>	MW-13A/B	<b>Depth Interval</b>	10-13 ft	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1459.jpg			<b>Time:</b>	15:26
<b>Photographer:</b>		Matt Miller			
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-13A/B. Core contains silty and sandy clay, with inclusions of shale.</p>					



Official Photograph No. 32



<b>Boring No:</b>	MW-13A/B	<b>Depth Interval</b>	13-15 ft	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1461.jpg			<b>Time:</b>	15:33
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-13A/B. Core contains silty and sandy clay with a remoulded texture and weathered shale (color transition from dark brown to tan).</p>					

Official Photograph No. 33



<b>Boring No:</b>	MW-13A/B	<b>Depth Interval</b>	15-20 ft	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1463.jpg			<b>Time:</b>	15:38
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-13A/B. Core contains weathered shale and silty and sandy clay.</p>					

Official Photograph No. 34



<b>Boring No:</b>	MW-13A/B	<b>Depth Interval</b>	20-25 ft	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1466.jpg			<b>Time:</b>	15:44
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-13A/B. Core contains weathered shale and silty and sandy clay.</p>					



Official Photograph No. 35



<b>Boring No:</b>	MW-13A/B	<b>Depth Interval</b>	25-30 ft	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1468.jpg			<b>Time:</b>	15:53
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-13A/B. Core contains weathered shale and silty and sandy clay.</p>					

Official Photograph No. 36



<b>Boring No:</b>	MW-13A/B	<b>Depth Interval</b>	30-35 ft	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1471.jpg			<b>Time:</b>	16:06
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-13A/B. Core contains weathered shale and silty and sandy clay.</p>					

Official Photograph No. 37



<b>Boring No:</b>	MW-13A/B	<b>Depth Interval</b>	35-38 ft	<b>Date:</b>	5/20/2013
<b>Image No:</b>	IMAG1472.jpg			<b>Time:</b>	16:10
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> Geoprobe Macrocore (direct push) soil core sample obtained during the installation of groundwater monitoring well MW-13A/B. Core contains weathered shale and silty and sandy clay with minor fragments of limestone.</p>					



Official Photograph No. 38



<b>Boring No:</b>	MW-13B	<b>Depth Interval</b>	40-45 ft	<b>Date:</b>	5/23/2013
<b>Image No:</b>	IMAG1521.jpg			<b>Time:</b>	14:40
<b>Photographer:</b>		Matt Miller			
<p><b>Subject:</b> 3.25" rock core obtained during the installation of groundwater monitoring well MW-13B. The core contains karsted and weathered limestone as well as weathered shale fragments in void filling mud. The weathered nature of the rock prevented recovery of a core from 38-40 ft depth. Lithology 38-40 ft assumed the same given the driller's description of formation hardness/continuity.</p>					

Official Photograph No. 39



<b>Boring No:</b>	MW-13B	<b>Depth Interval</b>	40-45 ft	<b>Date:</b>	5/23/2013
<b>Image No:</b>	IMAG1471.jpg			<b>Time:</b>	15:11
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> 3.25" rock core obtained during the installation of groundwater monitoring well MW-13B. The core contains karsted and weathered limestone as well as weathered shale fragments in void filling mud. Limestone fragments placed in sampling interval according to drillers description of formation hardness/continuity. (Mud and shale fragments cleaned from sample for clarity).</p>					

Official Photograph No. 40



<b>Boring No:</b>	MW-13B	<b>Depth Interval</b>	45 ft	<b>Date:</b>	5/23/2013
<b>Image No:</b>	IMAG1526.jpg			<b>Time:</b>	15:13
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> 3.25" rock core obtained from 45 ft depth during the installation of groundwater monitoring well MW-13B. Note the allochemical grains etched in relief on karsted surface, iron oxide staining, sparry texture (dark grey) outside of the fracture zone, and calcitic vein fill.</p>					



Official Photograph No. 41



<b>Boring No:</b>	MW-13B	<b>Depth Interval</b>	45-50 ft	<b>Date:</b>	5/23/2013
<b>Image No:</b>	IMAG1530.jpg			<b>Time:</b>	17:01
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> 3.25” rock core obtained during the installation of groundwater monitoring well MW-13B. The core contains karsted and weathered limestone. Note the light grey fossiliferous and sparry texture of the upper (left side in photograph) section of core in comparison to the dark grey shaley texture of the lower (right side in photograph).</p>					

Official Photograph No. 42



Boring No:	MW-13B	Depth Interval	50-54 ft	Date:	5/28/2013
Image No:	IMAG1560.jpg			Time:	15:08
Photographer:	Matt Miller				
<p><b>Subject:</b> 2.5” rock core obtained during the installation of groundwater monitoring well MW-13B. The core contains fractured shaley limestone. The 50-52.5 ft interval was lost after multiple drilling attempts recovered only fragmented pieces of the same lithology.</p>					

Official Photograph No. 43



<b>Boring No:</b>	MW-13B	<b>Depth Interval</b>	54-59 ft	<b>Date:</b>	5/28/2013
<b>Image No:</b>	IMAG1562.jpg			<b>Time:</b>	15:37
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> 2.5" rock core obtained during the installation of groundwater monitoring well MW-13B. Note the near vertical, shaley, relic bedding.</p>					



Official Photograph No. 44



<b>Boring No:</b>	MW-13B	<b>Depth Interval</b>	59-64 ft	<b>Date:</b>	5/28/2013
<b>Image No:</b>	IMAG1567.jpg			<b>Time:</b>	17:41
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> 2.5" rock core obtained during the installation of groundwater monitoring well MW-13B. The core contains fossiliferous and shaley limestone.</p>					

Official Photograph No. 45



<b>Boring No:</b>	MW-13B	<b>Depth Interval</b>	64-69 ft	<b>Date:</b>	5/28/2013
<b>Image No:</b>	IMAG1568.jpg			<b>Time:</b>	17:51
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> 2.5" rock core obtained during the installation of groundwater monitoring well MW-13B. The core contains fractured shaley limestone. Note the shaley cleavage and iron oxide staining.</p>					

Official Photograph No. 46



<b>Boring No:</b>	MW-13B	<b>Depth Interval</b>	54-59 ft	<b>Date:</b>	5/28/2013
<b>Image No:</b>	IMAG1562.jpg			<b>Time:</b>	15:37
<b>Photographer:</b>	Matt Miller				
<p><b>Subject:</b> 2.5" rock core obtained during the installation of groundwater monitoring well MW-13B. Note the near vertical shaley relic bedding and iron oxide staining in a natural fracture. Closed fractures likely occurred parallel to bedding planes during drilling action.</p>					



Official Photograph No. 47



Boring No:	MW-13B	Depth Interval	~59 ft	Date:	5/28/2013
Image No:	IMAG1565.jpg			Time:	15:38
Photographer:	Matt Miller				
<p><b>Subject:</b> 2.5” rock core obtained from approximately 59 ft depth during the installation of groundwater monitoring well MW-13B. This photograph highlights the features of the screened groundwater production zone in the bedrock at MW-13B. Note the nearly vertically oriented relic shaley bedding and iron oxide staining in a natural fracture.</p>					



Official Photograph No. 48



<b>Location:</b>	CSX Railroad Cut	<b>Orientation:</b>	Looking East	<b>Date:</b>	5/28/2013
<b>Image No:</b>	S13F0SAGD03			<b>Time:</b>	10:11
<b>Photographer:</b>	Terence Chuhay				
<p><b>Subject:</b> Fault exposure between shale and limestone members of the Ordovician Ottosey Shale. The exposed fault plane contains slickenlines and dips near vertical. The trend of the fault, as estimated from exposures on both sides of the CSX railroad cut, runs roughly northeast – southwest. This photograph is taken roughly due west of the MW-12A/B well cluster.</p>					



Official Photograph No. 49



Location:	Unnamed Tributary	Orientation:	Looking North (Upstream)	Date:	5/29/2013
Image No:	IMAG1576.jpg			Time:	11:01
Photographer:	Matt Miller				
<p><b>Subject:</b> Synformal fold forming the Unnamed Tributary stream channel on the eastern edge of the site. In this image, shaley, micritic limestone (left) is folded to near vertical bedding orientation against a highly weathered sandstone (right). The same lithologic materials are noted elsewhere in the Unnamed Tributary channel (See Official Photograph 50) and in the subsurface at MW-07B and MW-11B.</p>					



Official Photograph No. 50



Location:	Unnamed Tributary	Orientation:	Looking Southwest (Downstream)	Date:	5/29/2013
Image No:	IMAG1575.jpg			Time:	10:57
Photographer:	Matt Miller				
<p><b>Subject:</b> Micritic limestone contact with sandy shale in Unnamed Tributary stream channel on the eastern edge of the site. The same lithologic materials are noted elsewhere in the Unnamed Tributary channel (See Official Photograph 49) and in the subsurface at MW-07B and MW-11B.</p>					



Official Photograph No. 51(Composite)



Location:	SMS Decontamination	Orientation:	Looking North-Northeast	Date:	5/20/13-6/11/13
Image No:	A)IMAG1491.jpg, B) IMAG1516.jpg, C) IMAG1540.jpg, D) S13F0SAGD03IMAG1491.jpg			Time:	Various
Photographer:	Matt Miller (A-C), Terence Chuhay (D)				
<p><b>Subject:</b> Decontamination pad and IDW holding area 5/20/2013 – 6/11/2013. A) Decon pad after initial erection, but prior to use. B) Decon pad in use, subject (M&amp;W Drilling employee B. Lumpkin) is steam cleaning 6” diameter PVC used as temporary casing during well installation activities. C) Decon pad during the course of the project, covered to prevent rain water infiltration and runoff during non-work hours. D) IDW removal activities, subject (Unknown Marion Environmental, Inc. employee) removing wastewater via vacuum truck.</p>					



Official Photograph No. 52



Location:	MW-11B	Orientation:	Looking East	Date:	5/28/13
Image No:	IMAG1556.jpg			Time:	13:50
Photographer:	Matt Miller				

**Subject:** M&W Drilling, Inc. driller B. Woods overboring MW-11B with a Schramm T450 air rotary drilling rig. This photo specifically depicts emplacement of Symmetrix temporary casing after rock coring into competent limestone. Note cutting collection system (hose to collection hopper out of frame), and saturated formation condition. No aqueous drilling fluids were added during this operation, cuttings were translated up the tool string using only forced air.



Official Photograph No. 53



Location:	MW-13B	Orientation:	Looking North	Date:	5/28/13
Image No:	IMAG1561.jpg			Time:	15:25
Photographer:	Matt Miller				

**Subject:** M&W Drilling, Inc. driller Gary Aikens rock coring MW-13B with a Foremost B-59 Mobile rotary drilling rig. This photo specifically depicts coring operations to log the production (screened) zone in MW-13B.



Official Photograph No. 54



Location:	MW-11A/B	Orientation:	Looking East	Date:	6/05/13
Image No:	IMAG1634.jpg			Time:	15:08
Photographer:	Matt Miller				

**Subject:** MW-11B (immediate foreground) and MW-11A surface completion (foreground). The Unnamed Tributary parallels the treeline seen in the background. Surface water seep SW-02 is colocated with the timber pile (background, left).



Official Photograph No. 55



<b>Location:</b>	MW-12A/B	<b>Orientation:</b>	Looking Northwest	<b>Date:</b>	6/05/13
<b>Image No:</b>	IMAG1631.jpg			<b>Time:</b>	15:07
<b>Photographer:</b>	Matt Miller				

**Subject:** MW-12A and MW-12B (indicated in photo). The CSX Railroad cut is in the immediate background behind the treeline. The plastic 55-gallon drum empty, and has been used as a temporary well purge water holding vessel during groundwater sampling.



Official Photograph No. 56



Location:	MW-13A/B	Orientation:	Looking Northeast	Date:	6/05/13
Image No:	IMAG1635.jpg			Time:	15:09
Photographer:	Matt Miller				

**Subject:** MW-13A and MW-13B (indicated in photo). The fence in background serves as the northern site/property boundary. The Nortfold Southern Railroad cut is in the immediate background behind the treeline.



**J.M. Waller Associates, Inc.**

**Remedial Action Contract II Lite, Region IV, Photo Log**

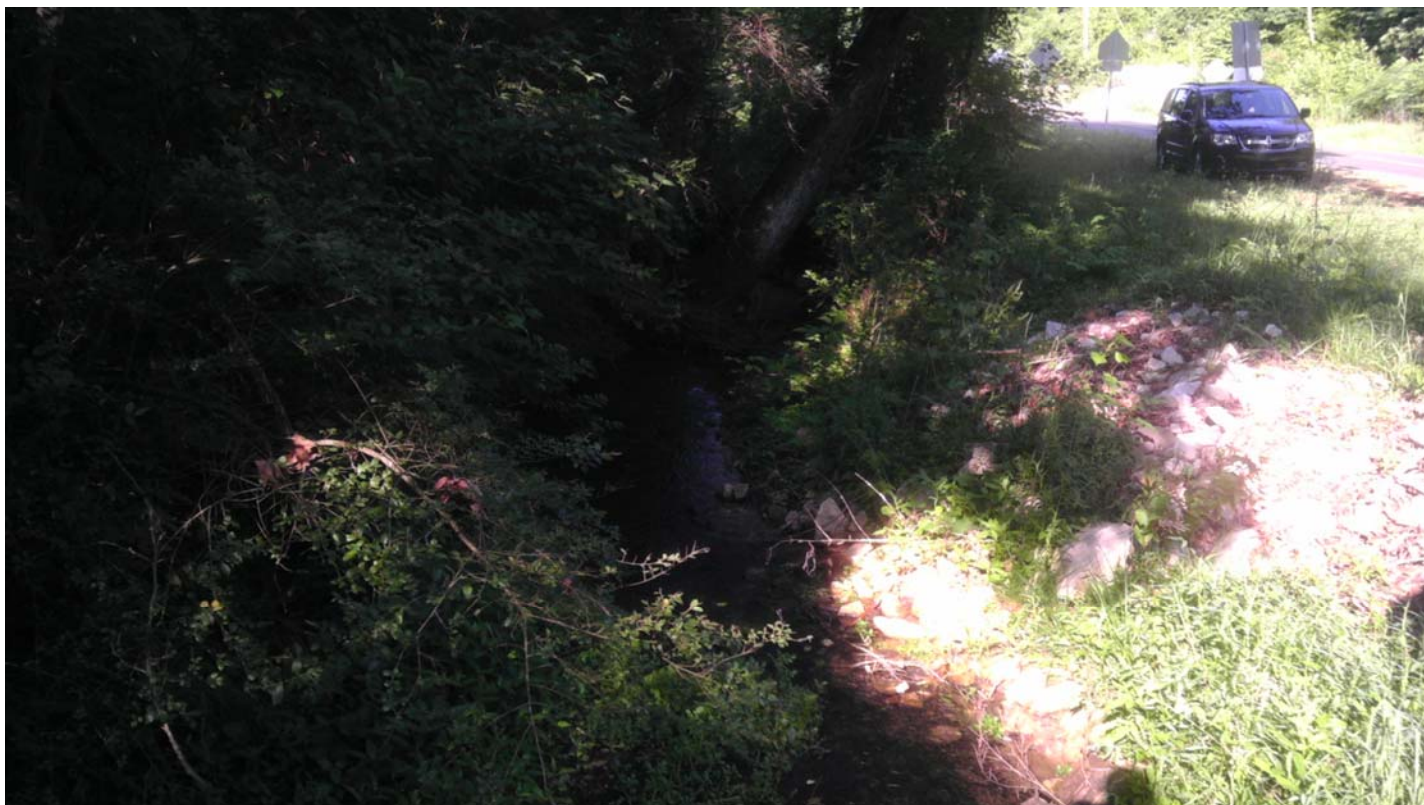
<b>Contract:</b>	EP-S4-08-03	<b>Site Name:</b>	Smokey Mountain Smelters Site
<b>Task No.:</b>	019	<b>Date:</b>	June 22-26, 2014
<b>RPM:</b>	Rusty Kestle	<b>Project Mgt.:</b>	Janice Austin
<b>PHOTO LOG</b>			

During the week of June 22, 2014, J.M. Waller, Inc. returned to Smokey Mountain Smelters for additional soil vapor, groundwater, and surface water sample collection. The following photographs show the sampling locations for all three media. Locations are specified with each photograph.

**ACKNOWLEDGEMENTS**

<b>SIGNATURE</b>	<b>Date:</b>	<b>PM SIGNATURE</b>	<b>Date:</b>
------------------	--------------	---------------------	--------------





**OFFICIAL PHOTOGRAPH NO. 1**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters Site

**Date:** June 22, 2014

**Photo Number:** Photo 1

**Time:** 08:44

**Orientation:** Facing Southwest

**Photographer:** CJ Roebuck

**Subject:** Surface water collection location SMSSW13, which is located on Flenniken Branch. There was a steady stream of water flowing ideal for sampling. The location is southwest of the site.





**OFFICIAL PHOTOGRAPH NO. 2**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters Site

**Date:** June 22, 2014

**Photo Number:** Photo 2

**Time:** 14:56

**Orientation:** Facing North

**Photographer:** CJ Roebuck

**Subject:** Surface water collection location SMSSW09. This location is located on Flennikan Branch, southwest of the site. There was standing water as well as flowing water to collect a sample.





**OFFICIAL PHOTOGRAPH NO. 3**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters Site

**Date:** June 22, 2014

**Photo Number:** Photo 3

**Time:** 15:20

**Orientation:** Facing North

**Photographer:** CJ Roebuck

**Subject:** Located on the west side of Flenniken branch, surface water location SMSSW14 was collected. The location was behind some residential housing and needed to be hiked to from the street.





**OFFICIAL PHOTOGRAPH NO. 4**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters Site

**Date:** June 23, 2014

**Photo Number:** Photo 4

**Time:** 08:47

**Orientation:** Facing North

**Photographer:** CJ Roebuck

**Subject:** Surface water collection location SMSSW09SPRING, located on the northwest side of Flenniken Branch, west of the site. The majority of the area had very still water for sampling.





**OFFICIAL PHOTOGRAPH NO. 5**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters	<b>Date:</b>	June 23, 2014
<b>Photo Number:</b>	Photo 5	<b>Time:</b>	09:08
<b>Orientation:</b>	Facing North		
<b>Photographer:</b>	CJ Roebuck		
<b>Subject:</b>	Surface water collection location SMSSW08SPRING, found on the North side of Flenniken Branch. Location found south of the CSX Railroad and on the other side of the bank from SMSSW08.		





**OFFICIAL PHOTOGRAPH NO. 6**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters Site	<b>Date:</b>	June 23, 2014
<b>Photo Number:</b>	Photo 6	<b>Time:</b>	09:21
<b>Orientation:</b>	Facing North		
<b>Photographer:</b>	CJ Roebuck		
<b>Subject:</b>	Surface water collection location SMSSW08 on the south side of Flenniken Branch. Location southeast of the CSX Railroad.		





**OFFICIAL PHOTOGRAPH NO. 7**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters Site	<b>Date:</b>	June 23, 2014
<b>Photo Number:</b>	Photo 7	<b>Time:</b>	10:26
<b>Orientation:</b>	Facing Northeast		
<b>Photographer:</b>	CJ Roebuck		
<b>Subject:</b>	Surface water collection location SMSSW12, located southeast of the CSX railroad and west of the site. Location was dry and not sampled. Area was barely moist where flowing water would've been found.		





**OFFICIAL PHOTOGRAPH NO. 8**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters Site	<b>Date:</b>	June 23, 2014
<b>Photo Number:</b>	Photo 8	<b>Time:</b>	13:08
<b>Orientation:</b>	Facing Southwest		
<b>Photographer:</b>	CJ Roebuck		
<b>Subject:</b>	Surface water collection location SMSSW03. This location was located East of the site, and needed to be hiked to for access. The location was completely dry and not sampled, although there was evidence of where water had previously flowed, it had apparently been dry for quite some time.		





**OFFICIAL PHOTOGRAPH NO. 9**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters Site	<b>Date:</b>	June 24, 2014
<b>Photo Number:</b>	Photo 9	<b>Time:</b>	08:55
<b>Orientation:</b>	Facing Southwest		
<b>Photographer:</b>	Alex Simpson		
<b>Subject:</b>	Location found at Knob Creek Embayment in I.C. King Park. Surface water collection location SMSSW10. Met Lee Barron with Tennessee State Department for boat and access to location. Embayment found southwest of the site.		





**OFFICIAL PHOTOGRAPH NO. 10**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters Site

**Date:** June 24, 2014

**Photo Number:** Photo 10

**Time:** 09:14

**Orientation:** Facing Southwest

**Photographer:** Alex Simpson

**Subject:** Location found at Knob Creek Embayment in I.C. King Park. Surface water collection location SMSSW20. Met Lee Barron with Tennessee State Department for boat and access to location. Embayment found southwest of the site.





**OFFICIAL PHOTOGRAPH NO. 11**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters Site	<b>Date:</b>	June 23, 2014
<b>Photo Number:</b>	Photo 11	<b>Time:</b>	09:15
<b>Orientation:</b>	Facing North		
<b>Photographer:</b>	Stan Thompson		
<b>Subject:</b>	Monitoring well SMSMW7A taken before sampling. This well is located on the southwest side of the site.		





**OFFICIAL PHOTOGRAPH NO. 12**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters Site	<b>Date:</b>	June 23, 2014
<b>Photo Number:</b>	Photo 12	<b>Time:</b>	11:20
<b>Orientation:</b>	Facing Northwest		
<b>Photographer:</b>	Stan Thompson		
<b>Subject:</b>	Onsite monitoring well location SMSMW7B, located on the southwest side of the site. Photograph taken during sampling.		





**OFFICIAL PHOTOGRAPH NO. 13**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters Site	<b>Date:</b>	June 23, 2014
<b>Photo Number:</b>	Photo 13	<b>Time:</b>	14:25
<b>Orientation:</b>	Facing North		
<b>Photographer:</b>	Stan Thompson		
<b>Subject:</b>	Onsite monitoring well location SMSMW11A, located on the southwest side of the site, along the tree line. Photograph taken before sampling well.		





**OFFICIAL PHOTOGRAPH NO. 14**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters Site	<b>Date:</b>	June 23, 2014
<b>Photo Number:</b>	Photo 14	<b>Time:</b>	13:15
<b>Orientation:</b>	Facing North		
<b>Photographer:</b>	Andrew Grimmke		
<b>Subject:</b>	Photograph of monitoring wells 12A (back-right) and 12B (front-left) at Smokey Mountain Smelters site during sampling. Wells are located on the west side of the site, along the tree line.		





**OFFICIAL PHOTOGRAPH NO. 15**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters Site	<b>Date:</b>	June 22, 2014
<b>Photo Number:</b>	Photo 15	<b>Time:</b>	14:25
<b>Orientation:</b>	Facing Northwest		
<b>Photographer:</b>	Andrew Grimmke		
<b>Subject:</b>	Soil Vapor location SMSSV14, Linda Nyland pictured. Location behind apartment community Montgomery Village, which is located on the east side of the site, on the other side of the Norfolk-Southern Railroad.		





**OFFICIAL PHOTOGRAPH NO. 16**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters Site	<b>Date:</b>	June 22, 2014
<b>Photo Number:</b>	Photo 16	<b>Time:</b>	14:26
<b>Orientation:</b>	Facing North		
<b>Photographer:</b>	Andrew Grimmke		
<b>Subject:</b>	Recon of soil vapor location SMSSV14 and SMSSV15. Soil vapor detection summa canisters set up along tree line behind apartment community Montgomery Village.		





**OFFICIAL PHOTOGRAPH NO. 17**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters Site

**Date:** June 24, 2014

**Photo Number:** Photo 17

**Time:** 12:02

**Orientation:** Facing North

**Photographer:** Andrew Grimmke

**Subject:** Photograph features taking a groundwater sample at SMSSVGW13 located at soil vapor location SMSSV13, a Geoprobe 6620 DPT rig was provided by subcontractor Bear Environmental pictured, as well as set up for sampling groundwater location 13.





**OFFICIAL PHOTOGRAPH NO. 18**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters Site	<b>Date:</b>	June 24, 2014
<b>Photo Number:</b>	Photo 18	<b>Time:</b>	15:46
<b>Orientation:</b>	Facing Southeast		
<b>Photographer:</b>	Andrew Grimmke		
<b>Subject:</b>	Advancing soil vapor location SMSSV10, Geoprobe 6620 DPT rig provided by subcontractor, Bear Environmental, pictured. Street pictured is Caleb Avenue, west of the site.		





**OFFICIAL PHOTOGRAPH NO. 19**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters Site

**Date:** June 24, 2014

**Photo Number:** Photo 19

**Time:** 16:43

**Orientation:** Facing East

**Photographer:** Andrew Grimmke

**Subject:** Collecting soil vapor using summa canister and shroud at location SMSSV10, Geoprobe 6620 DPT rig provided by subcontractor Bear Environmental pictured. Located on Caleb avenue, west of the site.





**OFFICIAL PHOTOGRAPH NO. 20**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters Site	<b>Date:</b>	June 25, 2014
<b>Photo Number:</b>	Photo 20	<b>Time:</b>	09:44
<b>Orientation:</b>	Facing South		
<b>Photographer:</b>	Andrew Grimmke		
<b>Subject:</b>	Preparing soil vapor location SMSSV8 with paste made from distilled water and bentonite, this is applies around the Teflon tubing to create an airtight seal for purging and sample collection. Driller with subcontracting company Bear Environmental picture with Geoprobe 6620 DPT rig.		





**OFFICIAL PHOTOGRAPH NO. 21**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters Site

**Date:** June 25, 2014

**Photo Number:** Photo 21

**Time:** 09:57

**Orientation:** Facing Southwest

**Photographer:** Andrew Grimmke

**Subject:** Testing location SMSSV8 for leaks using PID prior to sampling soil vapor. Location next to monitoring wells SMSMW13A and SMSSW13B on the east side of the site.





**OFFICIAL PHOTOGRAPH NO. 22**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

<b>Location:</b>	Smokey Mountain Smelters Site	<b>Date:</b>	June 25, 2014
<b>Photo Number:</b>	Photo 22	<b>Time:</b>	12:38
<b>Orientation:</b>	Facing Northwest		
<b>Photographer:</b>	Andrew Grimmke		
<b>Subject:</b>	Testing at location SMSSV13 for leaks prior to sampling soil vapor with PID, Geoprobe 6620 DPT rig provided by Bear Environmental also pictured. Location to the southwest side of the site next to the CSX railroad, along the tree line.		





**OFFICIAL PHOTOGRAPH NO. 23**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters Site

**Date:** June 25, 2014

**Photo Number:** Photo 23

**Time:** 12:40

**Orientation:** Facing Northwest

**Photographer:** Andrew Grimmke

**Subject:** Collecting sample at SMSSV13, picture has summa canister with transfer shroud for soil vapor collection purposes. Location to the southwest side of the site next to the CSX railroad, along the tree line.





**OFFICIAL PHOTOGRAPH NO. 24**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters Site

**Date:** June 25, 2014

**Photo Number:** Photo 24

**Time:** 13:44

**Orientation:** Facing North

**Photographer:** Andrew Grimmke

**Subject:** Collecting sample at SMSSV11 using shroud and summa canister, Geoprobe 6620 DPT rig provided by Bear Environmental also pictured. Location on the east side of the CSX railroad, on the west side of the site.





**OFFICIAL PHOTOGRAPH NO. 25**  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**Location:** Smokey Mountain Smelters Site

**Date:** June 25, 2014

**Photo Number:** Photo 25

**Time:** 16:15

**Orientation:** Facing South

**Photographer:** Andrew Grimmke

**Subject:** Drillers from subcontractor Bear Environmental pictures installing shroud at soil vapor location SMSSV10 to prepare for sampling. Sampling location on north side of Caleb Avenue, north of the site.